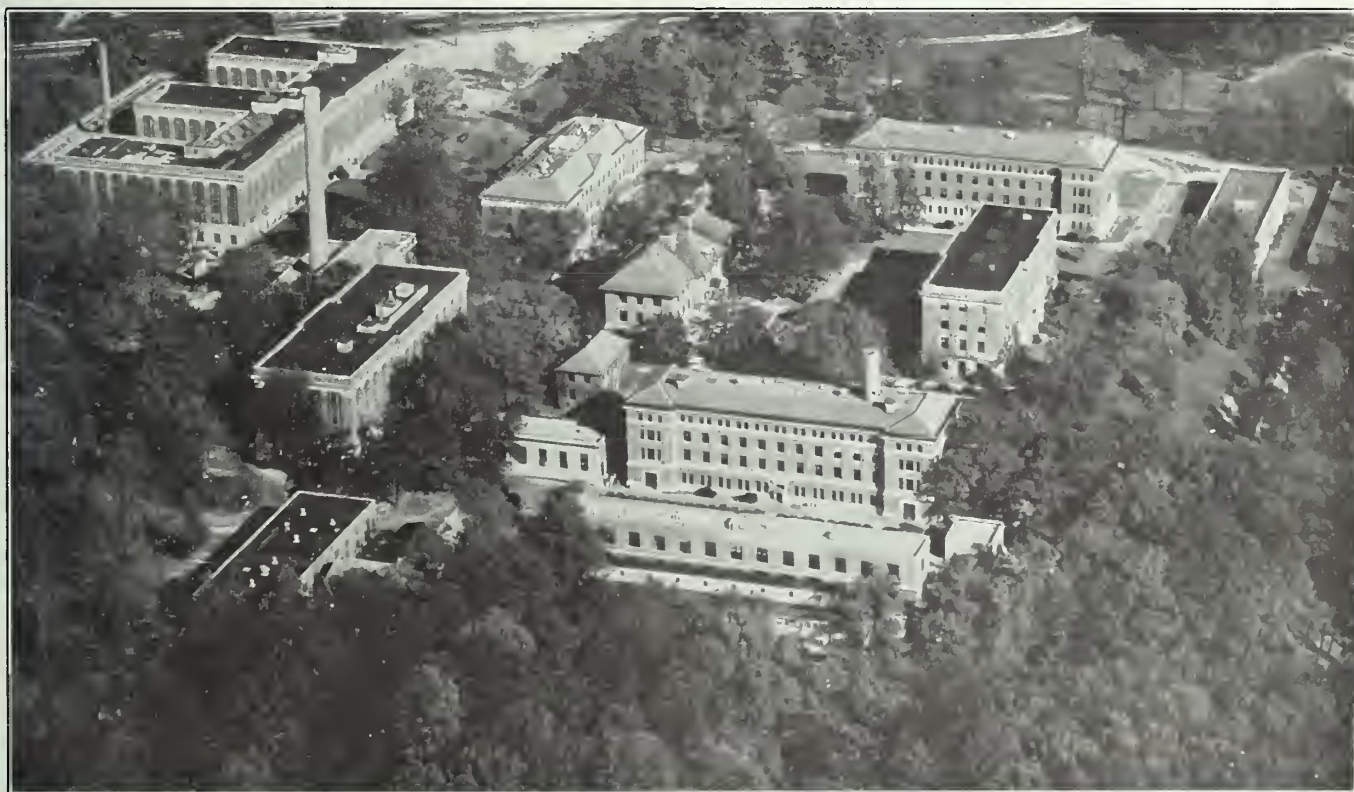


Bureau of Standards
JUN 25 1931

COMMERCIAL STANDARDS MONTHLY



*A Review of Progress in
Commercial Standardization and Simplification*



AIRPLANE VIEW OF NATIONAL BUREAU OF STANDARDS

ISSUED BY THE NATIONAL BUREAU OF STANDARDS OF THE
UNITED STATES DEPARTMENT OF COMMERCE, WASHINGTON, D.C., U.S.A.

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JUNE, 1931

The Commercial Standardization Group

DIVISION OF SIMPLIFIED PRACTICE

Edwin W. Ely

The division of simplified practice cooperates with industrial and commercial groups to reduce waste, usually through eliminating unnecessary variety of product, method, or practice. Its function is to bring together all parties interested in a project of this character, and to coordinate their work in developing a simplified practice recommendation. Such work includes surveys of current practice, formulation of a simplified practice program, and presentation of that program for action by a general conference representing all interests. The division then transmits to all concerned a full report of the general conference, with a request for written acceptance of the action taken. When the volume of acceptances is sufficient to indicate initial success, the Department of Commerce indorses the program and publishes the recommendation. The division thereafter cooperates with a standing committee appointed by the industry concerned, in conducting periodic surveys to determine the degree of adherence, to maintain and extend support of the recommendation, and to secure data for reaffirmation or revision. Simplified practice may be applied to any commodity or activity in which it will reduce waste. The division stands ready to render service in developing and making effective any application of simplified practice which will reduce waste, stabilize business, or extend commerce.

BUILDING AND HOUSING DIVISION

J. S. Taylor

The division of building and housing, formed in 1921, cooperates with business, technical, and professional groups in furthering construction activities. It works to modernize building codes and to encourage improved standards for the quality of building construction, and the practical application of the latest development in design and use of building materials.

It encourages home ownership through the development of an enlarged, steadier, more intelligent, and more discriminating demand for dwellings—the largest single class of buildings which the construction industries provide.

The division also cooperates with other governmental agencies and with many private business and professional groups in efforts to distribute building activity more evenly throughout the year and to secure less fluctuation from year to year.

The work on city planning and zoning has the broad objective of making buildings more useful through proper location with respect to other structures, stabilizing of land values and property uses, well coordinated thoroughfare systems, and well laid out public works.

DIVISION OF SPECIFICATIONS

A. S. McAllister

The duties of the division of specifications are to promote and facilitate the use and unification of specifications. In doing so it carries on activities involving cooperation with technical societies; trade associations; Federal, State, and municipal Government specifications making and using agencies; producers, distributors, and consumers; and testing and research laboratories. It ascertains the Standardization and specifications promoting activities of the associations and societies, and brings to their attention the work being done by the commercial standardization group. It brings the Federal specifications and commercial standards to the attention of the maximum number of producers and users of commodities complying with these standards and specifications. It compiles and distributes lists of sources of supply of materials guaranteed to comply with the standards and specifications. It shows both buyers and sellers the benefits from handling nationally specified, certified, and labeled commodities. The division prepares directories of governmental and nongovernmental testing laboratories and the Directory of Specifications, and is working on an encyclopedia of specifications, the first two volumes of which have been issued, namely, "Standards and Specifications in the Wood-Using Industries" and "Standards and Specifications for Non-metallic Minerals and their Products." It also aids in preparing the Standards Yearbook.

STANDARDIZATION
..IS..
A CONTINUING PROCESS
~
ITS AIM IS NOT FIXITY
OR STAGNATION
..BUT..
TO ADD SERVICEABILITY
AS OFTEN AS THE
POTENTIAL GAIN
MAKES IT WORTH WHILE

DIVISION OF TRADE STANDARDS

I. J. Fairchild

The division of trade standards, on request, assists industrial and commercial groups in the voluntary establishment of standards covering grades, quality, dimensional interchangeability, or other acceptance criteria as a national basis for marketing manufactured commodities.

The detail criteria are selected or determined voluntarily by interested buyers or sellers, without any Government dictation or domination, and adjusted at a general conference of producers, distributors, and users so as to represent the composite views of all branches. The division functions chiefly as a neutral agency to see that all interested elements are given full opportunity to be heard and satisfied; to solicit and record acceptances; and to publish and promulgate the standard when a satisfactory majority of acceptances is obtained and provided there is no active opposition.

Industries are encouraged to apply self-certifying labels to products meeting the commercial standard requirements, as a means of protecting the consumer and the scrupulous seller from misrepresentation or unfair methods of marketing.

Provision is made for regular revision of the standard through the appointment of a standing committee to consider periodically any necessity for revision of the standard, in order that it may be kept constantly compatible with progress in the industry.

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UNIVERSAL COTTON STANDARDS APPROVED

SIXTY-FIVE "key" sets of the Universal Cotton Standards were approved for use by American and European cotton exchanges and associations during the next two years, at the Fourth Biennial International Cotton Conference which was brought to a close May 13, 1931, at the United States Department of Agriculture.

THE CONFERENCE, which was opened May 9, was attended by representatives of nine leading cotton associations and exchanges of Europe and representatives of the United States Department of Agriculture and the American cotton industry. The conference was provided for by agreement between the Secretary of Agriculture and the European associations under which the latter have adopted the official cotton standards of the United States for American upland cotton, known as the universal standards, as the basis of all their contracts for the purchases and sales of American cotton in which grades are specified.

THE FINAL ACT of the conference was to seal and deposit with the United States Treasury the "first reserve set" which will be used two years hence, as the basis for making up new "key" sets for distribution among the adherents to the international agreements on universal cotton standards.

VARIOUS EUROPEAN DELEGATES at the conference urged the Department of Agriculture to endeavor to bring improved ginning methods into practice. Department officials replied that an experimental gin has been established recently at Stoneville, Miss., where investigations are being made with a view toward improved ginning methods.

“A BUSINESS PARLIAMENT OF THE WORLD”

World-Wide Economic Conditions Reviewed at Sixth Conference of the International Chamber of Commerce

The “Business Parliament of the World,” as the sixth general conference of the International Chamber of Commerce was termed, reviewed world economic conditions and existing relationships between the United States and the countries of Europe, at its Washington meeting, May 4 to 8, 1931.

The Old World came to the New World to discuss, in more or less informal terms, the most efficient methods for the prevention of future business setbacks, and to promote the comparison of business data through standard terminologies.

European manufacturers have always adjusted themselves to diverse languages and varying currencies, and to various weights and measures. Prof. Andre Siegfried, in his report, said “that if they [European manufacturers] export, it is difficult for them to standardize production because of the heterogeneous character of the foreign buyers. If they confine themselves to the home market, the element of mass production fails them.”

The need for standard methods of gathering and interpreting cost data in production was emphasized by various speakers at the conference. It was stated that no uniform distinctions of terms exist, as the accountants and economists are not in agreement with the terms and definitions describing definite business situations and practices. Cost comparisons between concerns in an industry, as well as those among various industries, are difficult to make because of the dissimilarity of accounting methods. The trend of industry toward concentration and mechanization has tended to make certain cost factors relatively more important. An adequate evaluation of the importance of costs of production requires accurate accounting for all elements of cost. Such accurate accounting, in order to yield comparable results, must be in harmony with sound economic principles, and must be built around a plan designed to obtain uniform results.

In order to be of real benefit in interpreting business progress in terms of economic theory uniformity of cost determination must fulfill national and international requirements. It is only by such means that nations can determine their status in relation to the economic forces acting both within and without their geographic boundaries.

The secret of the success of mass production in the United States, as compared to its status in Europe, was expressed by Alberto Pirelli, of Italy, honorary president of the International Chamber of Commerce, as follows:

As regards its uniformity, we shall not be far from the truth in stating that 120,000,000 inhabitants of the United States are more uniform in their tastes than the few million inhabitants of the smallest European country. It is a remarkable fact that the European stock, so proud of its individuality in matters of taste, and so attached to its racial and traditional characteristics on the Old Continent, should so rapidly and easily adapt itself in the New World to a uniformity which it would have considered intolerable at home. The size and uniformity of the market afford the indispensable conditions for enabling industry to organize on the most efficient lines.

This accounts quite largely for the success of mass production methods in the United States, based on large-scale output and standardization.

The advantages of mass production, when conditions will permit its application, are such that it allows expenditures on research, testing, and experimenting in order to promote higher quality production, Pirelli pointed out. He further stated that “when the American consumer consents to limit his demand for variety, he knows that in purchasing standardized (simplified) goods he is getting better value. It would, however, be a great mistake to conclude that standardization, mass production, and mechanization are unknown in Europe. They have been introduced especially in the more recent industries less tied down to preexisting conditions.”

Standardization of documents used in trade received consideration at the convention. The subgroup meeting on “sea transport,” expressed the belief that “uniform laws and uniform bills of lading are required for the proper handling of international commerce. When every country has a different law and every carrier a different form of bill of lading, confusion and litigation must result, and international trade is hampered by a condition which benefits no one and is harmful to all.”

Uniformity in bills of lading between North and South America will be discussed at length at the Fourth Pan American Commercial Conference, scheduled to be held next October, 1931, in Washington, D. C. (See *COMMERCIAL STANDARDS MONTHLY*, May, 1931.)

“Progress can be reported on the development of uniform nomenclature of goods,” George Theunis, president of the International Chamber of Commerce, told the convention. Continuing, he said: “The nomenclature established by the International Railway Union in concert with the International Chamber of Commerce, has been introduced in international rate schedules.” Regarding containers, he said that much study has been given to the matter, and that in order to arrive at rapid and really practical results, the International Chamber of Commerce, in cooperation with the League of Nations, the International Railway Union and other international organizations, had instituted a competition for a standard type of container for international transport. This competition has aroused the greatest interest in the industrial world, he pointed out. Already 19 of the most important industries in 7 countries have sent in their plans. A prize of \$7,500 will be awarded in July, 1931.

That the distribution of standardized production is much easier and less costly than that of the distribution of specialized goods, was explained by Ferruccio Lantini, president, the Confederazione Fascista del Commercio, Rome, Italy. In order to secure competent and reliable statistics on distributional costs, however, he said, it is necessary to have a uniform method of securing data from the various countries.

MAKING AMERICAN LUMBER STANDARDS EFFECTIVE

Code of Lumber Trade Practice Recommended for all Branches of the Industry

At the annual convention of the National Lumber Manufacturers Association held in Chicago, April, 1931, the board of directors adopted the Code of Lumber Trade Practice which had previously been accepted by the retail branch of the lumber industry.

The lumber manufacturers voted to indorse the code and the principles of lumber distribution at a joint meeting of the manufacturers and the directors of that association with the directors of the National Retail Lumber Dealers Association.

In the Trade Practice Code, which has been unanimously recommended to all branches of the industry, lumber trade terms are definable in accordance with American Lumber Standards, and basic terms and procedure are established for all branches of the lumber industry.

The following items in the code deal with American lumber standards, inspection, grade marks, shippers' certificates, misbranding, and definitions of lumber manufacturers, wholesalers, and retailers:

Trade terms.—Trade terms, definitions, and all other terms, words, or phrases relating to the manufacture, sale, invoicing, and shipment of lumber, in the absence of express agreements, are understood to be interpreted and applied in accordance with the applicable provisions of Simplified practice Recommendation R16-29, and the published official association grading or inspection rules applicable thereto.

Inspection.—Official inspection on complaint when required by either buyer or seller must be by an official association inspector, applying the rules agreed upon at the time of sale and, in the event of no such agreement, the official association grading rules and regulations, under which the lumber is commonly bought and sold. Official reinspection when invoked by either party with the consent of the other shall be final and binding on both parties.

Grade marks.—Lumber is a natural product, individual pieces of which may vary sufficiently in strength, grain, dryness, and other physical characteristics that the ordinary buyer may not intelligently judge where his requirements are met by the product offered. To assist buyers in securing uniformly graded lumber, official grading standards have been adopted by the industry and approved by the Government in Simplified Practice Recommendation R16-29; and as a further measure of protection, association grade marks corresponding to each grade of lumber and indicating its exact character have been adopted and are now being widely branded on lumber. Standard lumber, correctly marked, should be made available by the manufacturers and its use encouraged by wholesale, commission, and retail distributors. The use of marks of grades or species, other than the standard association marks, promotes confusion and facilitates deception and is condemned by the industry.

Tolerance in grading.—The tolerance of 5 per cent of degrade lumber allowed under standard grading rules is a safeguard established for the originating manufacturer's graders as the reasonable measure of

maximum ordinary differences in judgment between graders in the application of standard grading rules. To take advantage of this tolerance by deliberately including off-grade material within the limit of tolerance is condemned by the industry as an unfair trade practice.

Shipper's certificate and official certificate.—The use in ordinary shipments of the "shipper's certificate (or statement) of car contents" or "licensed shipment" is recognized and recommended. The recommended use of such certificate in shipments made through a wholesale distributor requires the omission at the request of the distributor of the name of the originating manufacturer. In shipments requiring official inspection at point of origin, the use of official certificate of association inspection is recognized and recommended.

Misrepresentation, false invoicing, and misbranding.—False statements by lumber purchasers or others of prices or terms offered, or of character of business or quality of product, designed to secure by deception lower prices or better terms from sellers, are condemned as unfair methods of competition. In buying lumber it is unfair for a retailer to pose as a wholesaler, or for a wholesaler to pose as a retailer when such is not the case. False invoicing in any branch of the industry whether as to sizes, grades, origin, species, dryness, tally, quantity, or price, or any other matter, is condemned as an unfair trade practice. The misbranding of lumber as to size, grade, origin, species, or condition of dryness is condemned as an unfair trade practice. The use of American standard grade names or sizes or other grade names or sizes published in the official association lumber-grading rules, as a designation of a grade or size not conforming to the standard grade and size of the same name, is an unfair trade practice; the sale or offering for sale, under standard grade names and sizes, of lumber not conforming in fact to said grades and sizes as defined in the standard grading rules is an unfair trade practice.

Confusion of grades.—The practices of intentionally "robbing," "hardening," or "sweetening" grades (that is, taking out the best material, or adding higher grade material) destroy grading standards, are methods of price discrimination and price deceit, and are condemned as unfair trade practices.

Arbitration.—Disputes between buyer and seller when they are unable to come to an agreement should be submitted to arbitration under one of the prevailing codes.

Misuse of word "lumber."—The use of the words "wood" or "lumber," either alone or in connection with other words, to describe materials not the product of the tree and/or sawmill is in and of itself a misrepresentation of the inherent nature and qualities of the articles so described, and is condemned by the industry as an unfair method of competition.

Lumber manufacturers, wholesalers, and retailers.—"A lumber manufacturer" is one who operates a sawmill with or without a planing mill, converting logs into lumber and other kindred commodities. "A lumber wholesaler" is one actively, continuously, and

principally engaged in the business of buying lumber from manufacturers or other wholesalers in quantity lots and selling it to wholesalers, retailers, and recognized wholesale trade, who maintains a sales organization for this purpose, assume credit risks and such other obligations that are incident to the transportation and distribution of lumber. He may work a limited territory intensively or cover a wide territory in some specialty. He is expected to be fully conversant with conditions, market possibilities, values, and the general requirements of the trade in the territory which he serves. "A lumber commission man" is one who sells lumber in carload lots for a manufacturer or a wholesaler and who is paid a stipulated amount

(known as a commission) on each individual sale, and holds a relation to the seller similar to that of a salaried salesman. "A lumber retailer" is one who maintains adequate and permanent storage and handling facilities, a sales organization for the consumer trade, and carries a well-assorted stock of lumber adapted to the needs of the consumers in his sales territory.

During the convention the board of directors of the National Lumber Manufacturers Association voted unanimously to continue the national trade-extension campaign, with the cooperation of timber owners, loggers, lumber manufacturers, wholesalers, retailers, and the principal lumber-consuming industries.

QUALITY CONTROL PLAN FOR RAYON TEXTILES

Failure to Use Tested Specifications Main Cause of Customer's Complaints According to Better Fabrics Testing Bureau

Failure of textile manufacturers to use tested specifications is the main cause of most customer complaints, according to a report on the retailers' return problem made by the Better Fabrics Testing Bureau, which is the official laboratory of the National Retail Dry Goods Association. This bureau finds that the buying difficulties of thousands of retailers are coming to an end with respect to getting consumer-tested rayon under the quality control plan of tested specifications.

In a review of more than 1,000 test reports on merchandise sent the Better Fabrics Testing Bureau laboratory for analysis by retail stores because the customer had complained of the lack of serviceability of the goods, one significant fact is worthy of discussion. It was found that the same errors were being made season after season, and the same causes of complaints were uncorrected year after year.

As pointed out in the report, it is apparent that the retailer pays thousands of claims each season to customers on return goods because the merchandise was unserviceable when sold, and likely the causes of complaint dated back several years. The records of the laboratory show that the retailer does little or nothing in many cases to stop complaints by correcting the causes at the source of manufacture, yet it seems that the only way customer returns of merchandise will ever be lessened with respect to under-specification goods will be to correct consumer defects in manufacturing textiles.

"Run-of-the-market merchandise is easy to buy and hard to sell," stated the report. "Retailers who merchandise for volume are finding it more difficult each season to keep sales up to quotas. In other words, it is hard to keep customers coming back for ordinary merchandise."

The bureau has evidence to show that the buying operations of the store are centered on budget control of purchases and price lines to meet competition, but very little emphasis is given to the basic worth of

the merchandise itself. A practice of this kind makes buying easier, but it makes selling to the ultimate consumer harder.

On a single point of merit in the rayon quality-control plan is a partial solution to the big problem to retailers everywhere—to buy serviceable rayon merchandise. The quality-control plan is based on consumer specifications for fabrics and garments, and the added advantage of constant tests of the merchandise truly identifies it as being of "tested quality."

"It is said that the retail buyer can not test all merchandise and must rely on experience with certain lines of goods. However, there is a fly in the ointment of this age-old, tried and true habit of buying. To-day the buyer is demanding lower prices, and getting them on merchandise which in the past was considered standard and bought at established prices. If the manufacturer sells for less, he must reduce the costs of merchandise, which is done by reducing consumer quality. Most retailers want to sell good merchandise because they know what people require in clothing. Yet many manufacturers are too weak under the strain of so-called easy selling methods to make things cheap, to produce good merchandise and sell it to the retail buyer on its consumer merit.

"One reason why buyers 'hound' the manufacturer for reduced prices is because the buyer has no other way of determining whether or not he is being overcharged. It is admitted that this system borders on auctioneering to the lowest buyer, but it is nevertheless a fixture of present day buying methods.

"The plan to provide the users of yarn products with 'tested specifications' for the manufacture of rayon merchandise is without precedent in the textile industry and is destined to establish a practice that will do more than any one other fundamental thing to correct the causes of customer returns of merchandise due to poor quality and deliberate imperfections made a part of the goods to cheapen them to a so-called bargain price, intended by the manufacturer to best the deal with the buyer."

INTER-AMERICAN COOPERATION IN CONTROL OF DISEASE

Causes and Control of Infectious Diseases Discussed at Second Pan American Conference of Directors of Health

By BOLIVAR J. LLOYD, M. D., *Medical Director United States Public Health Service*

Favorably inclined as I am toward coordination, combination, and standardization when these measures will produce economy of effort and efficiency of administration, I can not but view the results attained by the Second Pan American Conference of Directors of Health in standardization as a by-product of the conference rather than its *raison d'être*. It is a fact, however, that the leaven of standardization was introduced into and permeated the mass product, tending to leaven the entire lump. It may also be said that this leaven of standardization will no doubt continue to reproduce indefinitely as cooperation in the application of measures for the prevention of disease progresses.

In order to understand inter-American cooperation in the control of disease, let us recall the following facts concerning the bodies which bring about this cooperation. First, we have the Pan American sanitary conferences, of which there have been eight since 1902. Second, we have the Pan American Sanitary Bureau, which is the executive organ of the sanitary conferences, a permanently organized, continuously operating body, radicated in Washington in the building of the Pan American Union. The sanitary bureau cooperates closely with the international organization known all over the Americas as the Pan American Union, which latter body is the permanently operating executive organ of the conferences of the American republics. Finally, we have, taking place in Washington, and held under the auspices of the Pan American Sanitary Bureau, the quinquennial meetings of the national directors of health of the American republics, of which the meeting just terminated is the second.

It is not possible in a brief paper to do much more than enumerate the activities in which it may be expected standardization will result as a work of the conference, nor is it to be supposed that this is the first international conference in which standardization of procedure has been accomplished.

The success of practically all international conferences depends in great measure on the good will of those participating and on opportunity for individual expression. I can not refrain here from mentioning the fact that the encouragement and public recognition given to the conference by President Hoover did more to establish cordiality and freedom of expression than all else combined. The conference set a standard in harmony, in free but rational and courteous speech, and in cordiality, which may well be emulated by all succeeding international bodies of whatever nature.

Among the principal topics studied and reported upon by the conference were the following:

The prevention of blindness; the regulation and control of the production and use of narcotics; standards of purity and potency for biologic products, such as

serums and vaccines; provision of safe water and safe milk for all the people; the prompt reporting of communicable diseases; procedures of public health administration; malaria; parasitic diseases; maternal and child welfare; nutrition; white slavery and its concomitant, namely, the ravages of the so-called social (venereal) diseases; measures against tuberculosis; measures for the prevention, control, and eradication of such diseases as plague, cholera, smallpox, typhus, and yellow fever; studies and recommendations relating to a draft of proposed regulations for the prevention of the spread of disease by aerial navigation.

Discussing briefly some of the topics considered, it may be said that with regard to the prevention of blindness, the conference was unanimous in the opinion that the cleansing of the eyes of the child immediately after birth and the use of a solution of silver nitrate or an equally effective drug to prevent infection is imperative and should be compulsory. The widespread prevalence of trachoma among the Indians of the United States, as revealed by surveys made by the United States Public Health Service a few years ago, was commented upon and the suggestion made that similar surveys in other countries having large Indian populations might possibly reveal similar conditions among them. A number of other causes of blindness were discussed, among them a comparatively newly discovered disease called onchocerciasis, caused by filaria and found somewhat extensively in Mexico, Guatemala, and in other American countries. Measures were recommended for further study of this insect-borne scourge.

Recommendations were made looking to the adoption of more nearly uniform procedure in the control of the manufacture and sale of habit-forming drugs.

The desirability of adopting standard requirements for potency and purity of biologic products, such as serums and vaccines, was recognized.

The necessity of providing safe water for all the people was stressed. This may easily be done satisfactorily by a combination of sedimentation, filtration, and chlorination, though other methods may be used.

While recognizing the desirability of securing good, clean milk from nontuberculous cows as a health measure, the conference emphasized the necessity of pasteurizing milk in order to safeguard this important food when it is used by human beings.

It was the sense of the conference that the reporting of communicable diseases should be stimulated in all the republics, and that methods of reporting and blanks used should reasonably conform to one standard, in order to facilitate comparisons.

The importance of establishing a norm of public health administration by countries, States, cities, and other political divisions was recognized, and a resolution adopted recommending whole-time employees in all branches of the Department of Health and also

recommending that such positions be made permanent in character and removed from the domain of politics.

The importance of malaria as a public-health problem was recognized, and the conference urged that further effort be made to reduce the cost of efforts to control this disease by endeavoring to discover less expensive methods of combating the malaria-bearing mosquito.

The conference advised caution with regard to the use of the vaccine known as B C G (Calmette), which has been administered on a rather large scale in recent years, to infants under 10 days of age. It also brought out the fact that we can not be sure of the harmlessness of this procedure until a number of years have elapsed after the treatment is administered.

Perhaps the greatest achievement of the conference, both in standardization of methods and in actual accomplishment consisted in the studies and recommendations made suggesting modifications of proposed regulations for the prevention of the spread of disease by aerial navigation. The draft of these regulations was originally prepared by a committee of the International Office of Public Health of Paris. This draft was submitted to the director of the Pan American Sanitary Bureau, Surg. Gen. Hugh S. Cumming, who, in turn, some months ago, transmitted copies in Spanish, Portuguese, French, and English to the members of his directing council, and also to the

directing heads of the public health services of all the American republics.

A study made of these regulations indicated that in several instances their provisions were in conflict with the interests and safety of a number of American countries, due no doubt to the fact that they had been elaborated without due regard to sanitary organization as it exists in the Americas, and also due to a lack of proper recognition of differing geographical conditions and differing transportation facilities. When this came to be realized, numerous cablegraphic requests were received by the Sanitary Bureau asking that final adoption of these measures be postponed until they could be considered in conference by the directors of health and the members of the directing council of the Pan American Sanitary Bureau. Accordingly, these regulations were further studied in detail by the members of the conference and appropriate modifications adopted. Inasmuch as a representative of the Paris office was present and concurred in the proposed changes, it is believed that they will be approved substantially as proposed.

Immediately following the conference, Surgeon General Cumming, United States Public Health Service, and Dr. Gregorio Araoz Alfaro, Director of Health of the Republic of Argentina, left for Paris to collaborate in the preparation of the final draft of these important measures.

UNIFORM DESIGNATION OF DISEASES PLANNED

National System of Naming Diseases by Numbers Being Prepared For One Year's Trial

A national standard of naming diseases is being prepared at New York City by the National Conference on the Nomenclature of Disease, with which the United States Public Health Service is cooperating. The conference was organized about two years ago under the auspices of the New York Academy of Medicine, in cooperation with various medical societies and medical bureaus of the Government.

Each disease and its various aspects will be designated by code numbers, according to announcement made by the Public Health Service. Following a meeting of the executive committee of the conference May 11, 1931, on which the Public Health Service is represented, it was stated that the conference would assemble on December 14, 1931, at New York for the purpose of adopting the new terminology of diseases which then will be put into use in various hospitals throughout the United States for one year's trial.

After the year's trial is completed, the conference will assemble again to make final corrections in the new methods of designating diseases and to adopt it for general and permanent use.

Scores of specialists and medical organizations and committees are cooperating now in the preparation of the new standard nomenclature. Many of the various hospitals use their own special methods of naming disease. The Army, Navy, and Public Health Service each has different systems of officially designating a disease or injury. It is agreed that a definite standard of terminology is seriously needed. The new standard will make it possible to compare reports of various institutions, hospitals, and other medical

units, which, at the present, is difficult because of the variety of terms used to signify the diseases.

According to the Public Health Service this new terminology of disease will be of greatest value in the compilation of statistics on diseases and in the work of comparing disease reports made by various hospitals and units in different sections of the country, where, at present, different forms of nomenclature are used.

The proposed standard system of nomenclature will be based upon a numerical designation consisting of six digits. The plan is a combination of two systems: First, dividing the body into 11 anatomical divisions and the division of disease into 11 etiological categories. For example, the numerical designation of appendicitis under this system would be 661-100, which indicates that the disease is located in the digestive tract, and its cause is an infection, whereas acute appendicitis with an abscess would be indicated as 661-1X2.

This does not mean that physicians will write on hospital records the numbers 661-100, instead of appendicitis, but it means that the hospital authorities, in tabulating their records, will summarize these diseases under the numerical designation rather than under the written name.

The new plan has been sought for a number of years. Previous attempts to build up a new disease nomenclature for general use throughout the country have resulted either in direct failure or in the formation of a terminology which eventually was proven too unwieldy for general use.

PROPOSED REVISION OF CALENDAR APPROVED

American Committee Submits Recommendations to be Studied at League of Nations Meeting

The growth of general interest in the reform of the calendar, the use of the 13-period calendar in business, religious opinion on calendar reform, suggestions for perfecting the rule for leap year and the chronology of the Christian era are five topics discussed in a supplementary report submitted to Secretary of State Henry Stimson by George Eastman, chairman of the National Committee on Calendar Simplification, and Dr. Charles F. Marvin, Chief of the United States Weather Bureau, vice chairman.

As in the case of the committee's original report of August 14, 1929, the additional report was prepared for the State Department to enable this Government to comply with the request of the League of Nations for information from the United States on the question of calendar simplification.

The findings of the American committee, together with reports of national committees of other countries which have been studying the question, were made available to the Preparatory Committee on Calendar Reform which met at Geneva on June 8 to prepare for the international conference that is to be held in October.

The American committee finds that there has been a marked increase of public interest in calendar improvement during the last year, particularly from the point of view of its benefits to the individual, and that the religious objections that have been raised are confined to a small minority, principally belonging to Saturday Sabbath-keeping sects. A survey of sentiment among Protestant clergymen shows that exclusive of two Saturday-keeping sects, 82 per cent had no religious objections.

Reporting on the growth of general interest in this country, the committee said:

While the demand for the improvement of the calendar has continued to be manifested, especially in commercial, industrial, scientific, and educational circles, the committee finds that there has been a marked increase in the interest of the general public since submitting its original report in August, 1929. This is undoubtedly due to the growing recognition of the fact that an improved calendar in benefiting every agency of civilization must benefit the individual, and, too, that it would be of greater convenience to the individual in his personal affairs, social and home life. These viewpoints have been given emphasis in many of the public discussions throughout the country, and appear to have done much to rectify an impression given currency by some that calendar improvement is sought solely for the convenience of business life.

To this list of 1,154 national, regional, State, and city organizations in different fields of activity which had reported their favorable interest in calendar reform at the time of the committee's first report, the following are listed among those which have since taken favorable action: American Bar Association, American Hotel Association, Association of Government Officials in Industry, Brotherhood of Locomotive Engineers, American Optometric Association, National Council of Geography Teachers, Academy of Science of New Hampshire, and the Albany Association of Credit Men.

The committee's report also calls attention to the calendar reform referendum of the United States Chamber of Commerce taken in 1929 among its member chambers and trade associations which showed a majority of 57 per cent in favor of changing the calendar, and of more than two-thirds in favor of the participation of the United States in an international conference for the purpose.

The 13-period calendar, the report says, is now being used by at least 140 American manufacturing, merchandising, and publishing concerns, which exceeds by more than half the number first reported. They include a number of the country's largest corporations, and the gross business done by all of them probably aggregates well over \$1,000,000,000 a year.

The committee sent a questionnaire to these companies and found that of the 110 which replied, 93 were in favor of the adoption of the 13-period system as a universal 13-month calendar, 4 were opposed, 2 considered it unnecessary, and 11 were noncommittal. The replies showed that while the companies were unanimous in commending the 13-period system because it enabled them to make comparisons of costs, production, sales, etc., in convenient equal units of time, and because it facilitated budgeting, the necessity of using the regular calendar for many of their transactions caused various difficulties for the most of them. It was evident that they preferred to put up with these difficulties as much less serious than those which the 13-period system removed, but it was made clear that all difficulties would disappear if the regular calendar were changed into a 13-month fixed calendar, which everybody would use. Some stated that the 13-period calendar satisfactorily solved their calendar difficulties from a business point of view, and were in favor of its adoption as a general calendar because it would benefit all classes.

The answers showed also that in the construction of 13-period calendars out of the present irregular and varying system of 12 unequal months and changing dates of week days, there was considerable difference of arrangements and no standard of uniformity.

In dealing with religious opinion, the committee emphasizes that it had originally intended to leave the religious questions for the determination of the international conference in consultation with the interested religious authorities without reference to national limits. However, owing to efforts of orthodox religious leaders of the Jews and two Christian Saturday-keeping sects to obtain from Congress and the Government a favorable decision in advance of the conference on certain religious objections which they alone had raised, and because of claims that the rest of the religious population in this country had similar grounds for objection, the committee felt obliged to conduct an inquiry into religious opinion from a national standpoint.

The objections raised by this "small minority," it is explained, involve a question of theological dogma,

namely, whether the 7-day week is a divine institution ordained at the Biblical creation, which would be violated by the presence of one or two 8-day weeks in a "year day" calendar, such as the proposed 13 equal months fixed calendar.

Explaining that the attitude of the Roman Catholic Church on calendar reform had already been given to the League of Nations and that there was lack of affirmative information only in the case of the Protestant denominations, the committee reports that it conducted an inquiry among cross sections of Protestant clergymen of 12 leading denominations, and sent its questionnaire also to clergymen of the two Protestant Saturday-keeping sects—the Seventh-day Adventists and Seventh-day Baptists.

The replies received from 1,478 ministers conclusively refute the claims of the Sabbatarian spokesmen that the Protestant denominations, in general, share their objections with regard to the seventh-day sequence, the report says. Exclusive of the Saturday-keeping ministers, 82 per cent saw no objection on religious grounds to a fixed, perpetual, and uniform calendar having one 8-day week each year and two such weeks in leap year, while 75 per cent favored the adoption of such a calendar. The Saturday-keeping clergymen were nearly unanimously opposed.

Dr. Charles F. Marvin, Chief of the United States Weather Bureau, and vice chairman of the committee, presents in the report a scientific study of the present leap-year rule and suggests an improvement. Instead of omitting three days in every 400 years, as at present, he points out that omitting four in every 500 years would keep the calendar more closely in accord with solar conditions.

"Never before in history," writes Doctor Marvin, "has the question of perfecting the calendar received such world-wide consideration, with reference to all its features, as in the present day. It is therefore important that no feature of the calendar be overlooked in seeking a universal form for adoption in the twentieth century, in order that this generation may pass on to posterity the most perfect time-measuring device that science and ingenuity of man permit."

Doctor Marvin shows by mathematical calculations that the present leap year rule as a means of keeping the vernal equinox fixed to March 21 and the calendar in accord with tropical year is beginning to fail. In fact, the average date of vernal equinox is now more nearly March 20. By the year 2000 it will actually become March 20. The average date tends gradually,

century after century, to drift back toward January 1 under the present rule. Doctor Marvin shows by diagrams that by omitting four leap days in 500 years, the calendar would be kept true to solar conditions until the year 10000. The adoption of this rule would mean that four century years out of five would be nonleap years instead of three out of four as at present.

Doctor Marvin also suggests that before starting a new calendar two days be struck from the present calendar for the purpose of making our chronological reckoning exact from the beginning of the Christian era instead of to the year 321 A. D., when the rule for the date of Easter was adopted by the Christian Council of Nicaea, and from which the Gregorian chronology takes its start. He points out that when Pope Gregory in 1582 dropped 10 days from the faulty Julian calendar in order to restore the date of the vernal equinox to March 21, as fixed by the Nicaean Council, the error in the Julian reckoning that had accumulated between 1 A. D. and 321 A. D. was not accounted for. This amounted to two days.

The correction of this error, Doctor Marvin further points out, would be of impressive significance to Christianity. He shows that if the two days were omitted in connection with the adoption of a fixed calendar, every year would become an exact counterpart of the year 30 A. D., the last year of the life of Christ.

"It will be impressive to know in this twentieth century," he says, "that when we celebrate Good Friday, for example, on Friday, April 7—which is the ninety-seventh day of the year—it will be impressive to know that the Good Friday in question is the exact anniversary day name, year number, and all of the original day of the Crucifixion. In the same way Easter Sunday, Whitsunday, and every other day of the year 30 A. D. will have exact counterparts in the day names and year numbers in the new fixed calendar. If the days are not omitted, the disparity of two days in anniversary dates and the incongruity in calendar and chronological reckoning must prevail indefinitely. If the calendar is changed without omitting two days and with all years beginning on Sunday, then if Easter is fixed on the Sunday nearest the exact anniversary of the day of the Resurrection, as many desire, that Sunday will be April 9 (April 15 in a 13 months' calendar), but the day will be the exact anniversary of the Crucifixion, not of the Resurrection."

STANDARDIZATION OF BINDERS' BOARD

Technical data on binders' board secured by the paper section of the National Bureau of Standards were discussed at a joint meeting of representatives of the Binders Board Manufacturers Association and the bureau, held at the National Bureau of Standards on April 2, 1931. These data were requested by the association to assist it in the establishment of quality standards for binders' board in cooperation with the trade standards division of the National Bureau of Standards. Tests were made on 35 samples of binders' board, which comprises five different thicknesses of board from seven manufacturers.

The boards were tested for thickness, weight, bursting strength, tensile breaking strength, elongation un-

der tensile stress, flexural strength, including deflection at time of rupture, and bending strength. Values for number of sheets per 50-pound bundle and specific gravity were calculated from the tests of weight and thickness. The boards were graded for strength in much the same order by the four different strength-testing methods used. The flexural strength test, which was performed by bending a strip until it breaks by means of stirrups affixed to a standard tensile breaking strength tester, gave much the same type of information as the bending test, which was made with a Naumann-Schopper bending tester.

It was agreed that the data submitted were sufficient for the formulation of quality standards, and this is to be undertaken immediately by the association.

ACTIVITIES OF THE AMERICAN STANDARDS ASSOCIATION

American Standards Association Has Approved 185 Standards To Date; 178 Uncompleted Projects Are Under Study

Current developments of the following standardization projects under the auspices and procedures of the American Standards Association have been furnished by that association:

"Clean" bituminous coal.—A request for the initiation of a project for the establishment of standards for clean bituminous coal has been received by the association from the American Institute of Mining and Metallurgical Engineers. For some time discussion has been going on in the bituminous coal business about the meaning of "clean" coal. Most coal mined and shipped has had no preparation other than casual inspection and separation of the larger impurities in the mine by the loader; a large percentage, in addition to this, has the coal screened at the tippie and certain parts of it spread on picking tables and cleaned by hand; a smaller, but rapidly increasing percentage, is being cleaned by mechanical processes, either wet or dry, this treatment usually being of the sizes not cleaned by hand, although sometimes all of it is mechanically cleaned.

When coal thus treated is sold it is all sold as "clean" coal, while in some sizes of some coals there may be 0.5 per cent of pieces of impurities, others may contain 4 per cent. The smaller amount may be the absolute minimum which it is possible to reach, while the larger one depends upon the methods and management used. The amounts of impurities necessarily present will vary with the sizes of coal, being usually greater in the smaller sizes. It is obvious that the mine shipping "clean" coal on the minimum impurity basis is handicapped in competing with one shipping a larger amount, although both products may have been cleaned. In these days of price competition all of these items count, and an agreed-upon basis will be of help not only to the shipper, but also to the consumer, who will then for the first time know what he may expect when he buys "clean" coal, and will have a standard by which he can measure it.

Survey on speeds of machinery.—A questionnaire is now being circulated by the American Standards Association sectional committee on speeds of machinery for the purpose of determining present practice in various plants and industries with respect to the speeds of driving and driven machinery. The questionnaire is accompanied by a table listing a proposed series of standard speeds, which is submitted to those receiving the questionnaire for criticism and comment as to whether the speeds designated would cover the needs in a satisfactory manner. The table follows:

Proposed series of standard speeds (in revolutions per minute) for driving units and driven shafts of machines according to definitions are: 36, 56, 90, 133, 200, 300, 400, 600, 720, 900, 1,200, 1,800, 2,400, 3,600, 7,200, 10,620, 15,720, 23,400, 34,500, and 51,000.

Definitions for machine speeds were found by the committee to be necessary in developing its work, and

a set of definitions was, therefore, worked out and tentatively approved, as follows:

The machine speed of a built-in drive is the speed of the shaft on which the rotating element of the driving unit is mounted; a geared drive is the speed of the driving pinion; a coupled drive is the speed of the initial shaft to which the driving unit is coupled; a cone pulley belt drive is the speed of the countershaft; a single pulley belt drive is the speed of the driven pulley; a V-belt drive is the speed of the driven sheave; a rope drive is the speed of the driven sheave; a chain drive is the speed of the driven sprocket; a friction drive is the speed of the driven member.

In addition to the question as to whether the definitions of different machinery speeds mentioned above appear to be satisfactory, the following questions will be submitted to those canvassed: Can the proposed series of speeds be used for future design of equipment without undue difficulty? What speeds of driving and driven shafts are you (a) using in your plant, and (b) providing for in the machines which you manufacture? State type of machines in each case. What series of speeds of driven machinery and/or transmission equipment do you suggest be made American standard to cover (a) the requirements of the machines you use in your plant and (b) the machines which you manufacture? What kinds of product do you manufacture?

Committee on certification and labeling.—The special committee of the association's board of directors on certification and labeling has been appointed. The appointment of the committee was first contemplated as a result of the request of the National Electrical Manufacturers Association that the American Standards Association give consideration to the "certification plan" advocated by the National Bureau of Standards to popularize the products which manufacturers certify to be in accordance with specifications. The appointment of a committee to study the subject was authorized by the board of directors, but it was decided that the formation of a general committee should await a preliminary study of the subject by a committee of the board.

American Standards Association Yearbook for 1931.—The American Standards Yearbook for 1931 has just been published. The yearbook reviews the activities of the association during the past 12 months, describes developments in international standardization, and the cooperative activities of trade associations, technical societies, and Government departments in national standardization work in this country. Many important standardization projects were initiated during the past year under American Standards Association procedure, according to the yearbook. These projects include the standardization of foundry equipment, specifications for sieves for testing purposes, approval and installation requirements for domestic gas-burning appliances, and a code for

the prevention of dust explosions in coal pneumatic cleaning plants.

Several new safety codes were added to the large group of safety standards being set up under American Standards Association auspices for the guidance in accident prevention work of practically all branches of industry. Among the new codes are safety code for mechanical refrigeration, recom-

mended practice for the use of explosives in bituminous coal mines, the standard for fire-fighting equipment in metal mines, and safety code for woodworking plants.

One hundred and eighty-five standards, including 46 during the past year, have been approved by the association, and 178 uncompleted projects are now under way.

AIDING THE SMALL LUMBER MILLS

Southern Pine Association Offers Its Facilities to Small Lumber Mills of the South

The Southern Pine Association has blazed the trail to a general raising of the standards of the lumber industry by its development of a plan to make its facilities and services available to the large and important number of small mills in the South, editorially observes The Lumber Co-Operator. The demand for better lumber and better construction is constantly growing, and on the ability to meet that demand rests the security of the lumber industry and its markets.

The editorial points out that "with the present set-up of manufacturing lumber, the small mills produce a large portion of this material and every effort that is made to strengthen the position of lumber and fortify its standards must take into consideration the position of the small mill and its methods of operation and marketing. It is commendable that plans are materializing for an improvement and standardization of the products of these small mills; improvements in operation, in better merchandising, and in cooperation with other and large manufacturers. This development bids fair to be an important one in keeping the markets for lumber large; in keeping these markets inviolate from the attacks of other materials which strive continually to replace it."

Standardization or lack of it; stabilization or demoralization; quality or inferiority of product is tied up intimately with the operation of the small mills. On this point the editorial writer of The Lumber Co-operator said that:

The Southern Pine Association has made definite progress by placing its services at the disposal of these small southern mills. Further progress is evidenced by the wide acceptance on the part of many of these small operators.

With all the expenditures being made for promotion of lumber and for stimulating the demand and keeping the markets receptive, it is obvious that this lumber should come to the consumer in a standardized manner with the least amount of confusion and the greatest amount of uniformity so that it will be easy to know lumber, to use it, and to specify it with the assurance that it is going to be always what it is expected to be. With this knowledge as a foundation, then it is easy to see that merchandising and promotion can go to greater heights and can offer greater inducements to increase the markets for lumber.

STANDARD TYPE POWER BOATS AND BARGES

The Inland Waterways Corporation has designed and is building an express boat of 2,200-horsepower Diesel direct drive, with a draft of only 6 feet, as part of its program of standardizing equipment. Twenty standard-type barges for both bulk and merchandise cargo are also being built. It is contemplated that within the near future power boats and barges of

standardized construction will be used over the entire waterways system.

In his annual report to the Secretary of War Maj. Gen. T. Q. Ashburn, chairman of the corporation, stated that they have four express boats capable of carrying 1,600 tons on an 8-foot draft, and, if demand requires, the corporation expects to put the new Diesel direct-drive boat, the *Herbert Hoover*, in this service. This boat will be capable of carrying a tow of two or three barges through as fast as a self-contained unit of the express boat type, with two or three times the amount of cargo at approximately one-half the cost.

SIMPLIFIED PACKAGING OF OVERHEAD ELECTRIC RAILWAY MATERIALS

A simplified practice recommendation covering the packaging of 20 items of overhead electric railway materials was approved by a general conference of representatives of all interests, held under the auspices of the division of simplified practice, National Bureau of Standards, May 7, 1931, at Pittsburgh, Pa. Mimeographed copies of this recommendation will be mailed to the industry for consideration and signed approval.

The recommendation concerns the packaging of the following materials: Protecting trolley armor, pole bands up to and including 6 inches, pole bands 7 inches and over, fork bolts with insulator one-half inch diameter, fork bolts with insulator five-eighths inch diameter, angle cross-arm braces, flat steel cross-arm braces, crossings or crossovers, trolley wire clinch ears, trolley frogs, straight line hangers, cap and cone insulators, section insulators, strain globe and giant insulators, wood strain insulators, feeder pins for steel cross arms, straight line suspension pullovers, trolley wire splicing sleeves (soldered), trolley wire splicing sleeves (mechanical), and line section switches.

It has been estimated that light and power companies make more than 1 per cent of the country's total annual purchases. This amount, which seems small when expressed in percentage, actually runs into an annual total of many millions of dollars. Any program of simplified practice which successfully eliminates any portion of the avoidable waste formerly incident to the disbursement of such large sums of money, should make possible substantial savings.

While this particular simplified practice recommendation is confined to methods of packing and handling items of overhead electric railway materials, it is expected that engineers, purchasing agents, works superintendents, and all who are engaged in the production and distribution of light and power will derive such tangible results from the recommendation that it will become desirable to extend the application of the principles of simplification to other items in the electrical industry.

U. S. S. R. EXPANDING ITS STANDARDIZATION PROGRAM

Program of U. S. S. R. Standards Committee for Current Year Outlined

During the current year the glass and porcelain industry of the U. S. S. R. (Union of Socialist Soviet Republics) will submit to the All-Union Standards Committee a total of 86 standardization projects for approval, according to A. Bogoslavsky, in the Standardization Review, official organ of the U. S. S. R. Standards Committee, with offices at Moscow.

Mr. Bogoslavsky states that the development of standards for finished products of the industry will be nearly completed this year, and after the conclusion of this program, recommends that the activities be directed toward the development of better types of machinery and to the standardization of processes.

In the same issue of the publication D. G. Budnevitch, vice president of the U. S. S. R. Standards Committee, explains the general standardization plan of the committee for 1931. The plan comprises 4,500 items from various industrial fields. In his article he shows by many examples taken from different industries, that through the elimination of waste great savings are annually obtained amounting in some cases to several millions and even to hundreds of million roubles with regard to some standardized items. The difference of the principles on which Soviet standardization is based, from the standardization methods of other countries is clearly shown by the writer. Whereas standards in other countries are a product of agreement between competing groups, in U. S. S. R. under the economic conditions with no conflicts arising between individual industries, where there is no competition nor anarchy of production, standards are the product of the planning reason of the state, he points out.

There is contained in the Standardization Review a thorough discussion of the importance of standardization work for the coal industry in connection with the development outlined by the 5-year state plan, by M. Grigorovitch and J. Beresnevitch. The article deals in detail with the plan for 1931 and with its general principles. The figures originally outlined by the 5-year plan for 1931, amounted to 54,800,000 tons of coal, and have recently been increased to 83,000,000 tons, the latter figures exceeding more than 73.5 per cent the production of 1930. The writers point out that typization and standardization would accelerate and cheapen the opening of new pits, adding that standardization should cover methods of sampling, testing and analysis, classification, handling

equipment, mine transportation (mine cars, tracks, signals, switches), illumination, ventilation, and concentrators. There are 230 items in this field scheduled for standardization.

In order to shorten the terms of building new district power plants and to eliminate in this way the disproportion between the growth of industry and the supply of electric power, J. Tzyshevsky suggests in his article, Some Problems of Standardization in Electric Construction, that all district power plants be subdivided into three groups dependent upon the remoteness of consumers. All proper types of equipment should be prepared in good time considering that the rate and tempo of building the power plants in question depend exclusively on the fact whether their equipment has been prepared in time, he said.

Though several standards for white pigments, red lead, etc., have already been approved by the U. S. S. R. Standards Committee, S. Volcovsky points out a whole series of measures that should be undertaken to increase to a great extent standardization in the industry. This is of special importance in connection with the fact that the Russians must make use of artificial drying oils in the manufacture of paints and colors.

A thorough discussion of the recently approved standard for the ash contents of Donetz and Kuznetsk coking coals is given by A. Greener. The author illustrates the enormous consequence of this standard for improving the quality of the coals. This standard for the first time in the history of Donetz coal district sets up a standard ash content for coals of separate pits and mines, taking into account both natural factors and concentrators, and is of special importance for the standard operation of coke ovens and for obtaining coke of uniform quality.

In a discussion of standardization of types for railway rolling stock, N. Tshapov and V. Feodorovitch draw attention to the unsatisfactory service of types used for the railway rolling stock. The requirements types have to meet at present, according to the existing specifications, are quite inadequate, especially for the heavy conditions of service. Comparing these requirements with those of some foreign standard specifications, the authors insist upon including in the specifications new requirements, such as definite class of steel, chemical composition, etc.

STANDARD SPECIFICATIONS IN THE GRAY IRON INDUSTRY

Both the National Association of Purchasing Agents and the California Chamber of Commerce have given recognition to the sales agreement and trade customs defining the conditions covering the sale of gray iron castings as developed and adopted by the Gray Iron Institute. The first-mentioned organization has approved these conditions which have been given indorsement and publicity by the

Chamber of Commerce of California. Incorporated in the sales agreement and customs are recommendations relating to colors for painting the various parts of foundry patterns. These colors, which have been agreed to by several organizations in the foundry trade, formed the basis of Commercial Standards CS19-30 issued by the National Bureau of Standards.

Considerable progress is now being made by the technical department of the Gray Iron Institute in developing standard specifications for different types of gray iron castings for various services.

METHODS OF MASS PRODUCTION¹

Testing and Inspection of Purchased Materials Facilitated Through Use of Standard Specifications

By WILLIAM BUTTERWORTH, *United States Chamber of Commerce*

The development of mass production methods of manufacture is recognized as a significant factor in the phenomenal expansion of American industry during the past 30 years. The rapid growth of a number of large-scale industrial enterprises has given rise to the belief that the industries of the United States are dominated by large corporations manufacturing tremendous quantities of goods by mass production methods. Mass production is frequently confused with any type of quantity production by the use of machinery. As a result, both the volume of goods made under mass production methods and the extent of their adoption are frequently overestimated.

The term "mass production" promptly calls to mind a picture of large factories employing thousands of workers. Yet the average manufacturing establishment in the United States employed only 42.3 wage earners in 1929, the latest year for which complete data are available. It can not be assumed that even the majority of the plants employing more than 500 wage earners are operating on a mass production basis. In its technical sense mass production refers to method rather than to quantity. No definition of this term which satisfactorily distinguishes between mass production and other methods of quantity production has gained general acceptance.

Mass production methods are not adaptable to the manufacture on a large scale of nonstandardized products which are fabricated on special order. Products of this type include machine tools, locomotives, high-grade clothing, power-house equipment, steel girders, cut stone, and other materials used in building construction. It is possible, however, to produce under mass production methods standardized piece parts which are used in completed articles produced with general purpose machinery on an individual basis. The terms "large-scale production" and "mass production" have been popularly regarded as being synonymous. There is, however, an essential difference between the two terms although the boundary line between mass production and large scale or quantity production is often difficult to determine. The distinguishing factor is the degree to which, in mass production, variable factors, such as materials, sizes, quality, finish, color, and methods of fabrication, are reduced to a minimum. A plant turning out job lot orders on a quantity basis may often introduce a modified type of mass production methods by an increase in the lot quantity, the specialization of labor and the use of single purpose machinery.

Complete uniformity of a product can only be obtained when the materials which enter into its manu-

facture are wholly standardized. The purchase of raw materials and component parts entering into the finished product has become a highly specialized management function. Most mass-production companies maintain a distinct purchasing staff. The responsibility for securing materials which will meet the requirements of mass production is frequently divided between the purchasing department, the engineering department, and the inspection or research laboratory.

The need for absolute uniformity of materials has led to a trend toward buying on contract from tested vendors instead of relying upon competitive bidding. A combination of these two systems is nevertheless quite common. Of course, all purchased material must be ordered from definite specifications. These specifications are drawn up by the company's technical staff. Standard specifications for many basic commodities have been prepared by the National Bureau of Standards and by various technical organizations and trade associations, such as the American Society for Testing Materials and the Society of Automotive Engineers.

An investigation into the manufacturing methods and materials used by potential suppliers precedes the development of specifications for products purchased by one large electrical manufacturing company. The specifications when finally drawn up thus can be readily met by the suppliers at most advantageous prices. Rigid requirements of quality are insisted upon, and complied with without difficulty because of the adjustment of the specification to the production facilities of the supplier.

Aside from the technical necessity for standard materials entering into mass production there is a distinct price advantage to be attained through standardized purchasing methods. In the first place, fewer varieties of material need to be ordered. There is a corresponding increase in the quantities required. Large quantities of a single uniform material may be ordered in advance of actual manufacturing demand in order to take advantage of favorable market quotations. In some companies using completely standardized materials or component parts, the purchasing departments are permitted to order enough stock to meet the requirements for several months' production. In other companies which have standing contracts with suppliers, excessive inventories may be avoided through the purchase of small quantities of identical materials or parts in a volume sufficient only to meet the demands of several days' production. Such a policy also results in a substantial decrease in the storage facilities required.

The testing and inspection of purchased material are greatly facilitated through the adoption of standard specifications. Usually, because of the large quantities of goods purchased, a sampling method of checking the quality is adopted. Some plants make a practice of testing samples before entering into contracts for supplies.

¹ Abstracted from the report prepared by the American section of the International Chamber of Commerce and submitted to the May 4 to 9 convention. Mr. Butterworth, former president of the United States Chamber of Commerce, was chairman of the American section preparing the report.

UNITED STATES INSTITUTE FOR TEXTILE RESEARCH

Simplification of Plans for Research is Being Effected by Our Second Largest Industry

By WARREN E. EMLEY, *National Bureau of Standards*

The American public spends more money for textiles than for any other purpose except foods. The textile industry may, therefore, be called our second largest. It is so large, in fact, as to have lost coherence, and people usually speak of the cotton industry, the carpet and rug industry, the laundry industry, etc., thus breaking down the great textile industry into its component parts.

A multiplicity of trade associations serve the various branches of the industry. Some of these are composed of users of a particular fiber, such as the National Association of Wool Manufacturers; others are composed of the manufacturers of a particular kind of product, such as the Cordage Institute. The distributors have the National Retail Drygoods Association, the consumers the American Home Economics Association, and the refreshment branches have the National Association of Dyers and Cleaners, and the Laundryowners' National Association. In general, an individual in the textile industry can avail himself of the services of three or four national organizations. Their functions run the entire gamut from the highly commercial Association of Cotton Textile Merchants of New York, to the highly technical American Association of Textile Chemists and Colorists.

All of these organizations are engaged in research work—scientific, technical, or economic. Many manufacturers support research laboratories which are noted for the excellence of their equipment and personnel. So also, are those of the textile schools. Leading retailers employ commercial testing laboratories, or maintain their own, and it has frequently happened that these laboratories have been forced into research work to develop new testing methods or to learn more about new fabrics. The home economics departments of our State colleges have been looking after the interests of the consumers. The refreshment industries have their own laboratories, and also maintain research associateships, the dry cleaners at the National Bureau of Standards and the laundry owners at Mellon Institute.

One would expect that this vast army of research workers would soon put the textile industry in the van of progress, and great progress has indeed been made in the past few years. These workers, however, are chiefly engaged in the application of known

facts to the solution of their problems. With increasing frequency they have found themselves facing situations where the needed facts are not yet known. When this happens, there are two courses of action open; to use an assumption instead of a fact, or to divert the efforts into scientific research to find the fact. Since the latter course is apt to be quite expensive, and will likely require a kind of personnel and equipment not available at the time, the former course is the one usually taken.

A few laboratories—the National Bureau of Standards, Massachusetts Institute of Technology, Yale University, and others—are conducting scientific research work; finding the facts for the textile industry to use. The industry has recently given formal recognition to the value of this work by organizing the United States Institute for Textile Research, incorporated under the "membership laws" of the State of New York. The avowed purpose of the institute is to stimulate and support research for the benefit of the industry as a whole. It has already become evident that only the scientific research needs stimulating; applied research needs correlating.

The first requirement of the institute was exact information as to just what textile research work is now being conducted, and who is doing it. Fortunately, the Textile Foundation (Inc.), was willing to finance this survey, which is now nearing completion. When this information becomes available, unnecessary duplication of effort can be readily avoided, and problems can be referred to those laboratories which are best equipped to handle them. Moreover, information will be developed as to those facts which are missing and which are now needed, and scientific research can, therefore, be directed toward ends known to have an immediate practical application.

With Dr. Samuel W. Stratton as president, and with a board of directors fairly representative of the many interests of which the textile industry is composed, the institute is now in a position to function. It is planned to correlate the vast amount of research work which is under way; to direct the research efforts more along scientific lines, in order that the foundation of the industry may be firmly established; and to make the textile industry more attractive to the younger scientists.

UNIFORM SIZES FOR GLASSINE BAGS

A general conference of representatives of manufacturers and distributors of glassine bags used in the confectionery and baking business adopted a simplified practice recommendation for the sizes of these bags at a meeting held under the auspices of the Division of Simplified Practice, National Bureau of Standards, on April 28, 1931, in New York, N. Y.

The program establishes uniform sizes for both flat and square bags for specific purposes, such as bread,

pies, and cakes, and the sizes of general-purpose bags of capacities from 1 ounce to 2 pounds used in the confectionery trade. The sizes adopted represent a substantial reduction in the sizes heretofore carried in the trade for all uses. While the present proposal, which will become effective one month after approval by all interests, is limited to this type of bag, the industry intends later to simplify the sizes of other types of bags used in the confectionery, baking, and other trades.

MAINTAINING THE STANDARD UNIT OF RESISTANCE AT THE NATIONAL BUREAU OF STANDARDS

Improved Type of Resistance Standard Devised as a Means at Maintaining Constant Value for the International Ohm

By J. L. THOMAS, *National Bureau of Standards*

The unit of electrical resistance, known as the "international ohm," is defined as the resistance of a column of mercury of specified length and mass, measured at the temperature of melting ice. While the definition is rather simple, the realization of this unit to the desired accuracy is extremely difficult. Even the most skilled experimenters—working with the greatest care—have been unable to set up mercury columns which will give duplicate results of sufficient accuracy for present-day needs. The result is that there is now an uncertainty in the value of the international ohm of at least 20 parts in 1,000, although precision resistance standards of nominally the same value may readily be compared to within 1 or 2 parts in 1,000,000.

Because of the large amount of work involved in setting up mercury ohms and the uncertainty of the unit realized from them, a unit has been maintained in the National Bureau of Standards by means of wire-resistance coils. Values were assigned to these reference coils in 1910 in terms of the average of the international ohms as realized in England and in Germany from a number of mercury ohms set up only a short time previously in each of these countries. At that time this particular international ohm, since known as the Washington unit, was recommended for general use. It gave the different countries the same basis of reference, although it was understood that this basis might be changed later if more accurate mercury ohm determinations were made.

Since its establishment, the Washington unit has been maintained for this country by means of a group of ten 1-ohm coils of manganin wire. These coils are intercompared at regular intervals and a value assigned to each on the assumption that the average value of the resistance of the coils remains constant. The individual coils seldom change as much as 3 or 4 parts in 1,000,000 a year with respect to the average. If any coil of the group changes in resistance by an unusually large amount, it is replaced from a reserve stock by a coil that has remained sufficiently constant in the preceding several years. While it is possible that the resistances of all 10 of these coils vary in the same way by large amounts, their relative values changing but little, it is not probable that they do so. Intercomparisons are made with other countries whenever they set up mercury ohms and these intercomparisons seem to show that our unit has remained very constant. As nearly as can be told, the average yearly change has not been more than 1 part in 1,000,000 during the last 20 years.

The standards used since 1910 to maintain the unit of electrical resistance are of the sealed type developed at this bureau by Rosa. One-ohm coils of silk-covered manganin wire were wound on brass tubes about 1 inch in diameter and 3 inches long. After winding, the coils were impregnated with shellac varnish and baked for several hours at 140° C. This baking not only dried out the varnish, leaving a fairly impervious

insulating coating, but it also increased the stability of the resistance of the coils. After baking, the coils were kept for several months, then carefully adjusted, and sealed in air-tight containers filled with oil.

During the baking, the resistance of manganin coils will generally decrease, probably as the result of a partial annealing of the wire. After the baking, however, the resistance will generally increase, fairly rapidly at first, then more and more slowly. Hence, for resistance standards of the highest quality it is necessary to keep the coils for several months after baking before making final adjustment of their resistance. During this time the rise in resistance will often amount to 100 parts in a million.

The need for increased accuracy in technical electrical measurements has made it seem desirable to increase the stability of standards used for maintaining the unit of electrical resistance. For this purpose a new type of 1-ohm standard has been developed at the National Bureau of Standards which promises to be highly satisfactory. The change in resistance in the first few months after baking is only 2 or 3 parts as contrasted with the change of about 100 parts in 1,000,000 which often occurred in coils of the older type. It seems reasonable to expect a considerably greater stability over a period of years for standards of the new form, since they are so much more stable immediately after baking.

In making the new standards, bare manganin wire is wound tightly on a steel tube, and then heated in a furnace to about 500° C. This so thoroughly anneals the wire that it will retain its helical shape when it is removed from the steel tube upon which it is annealed. These coils are put on silk-insulated brass tubes, the turns separated by winding linen thread between, and then the coil is shellacked and baked at 80° C. to dry out the shellac.

The brass tube upon which the coil is mounted forms the inner wall of a double-walled container. A second brass tube of slightly larger diameter is put over this one, and the two are separated by means of brass rings at each end. The container is made air-tight by soldering the brass rings to the tubes. Wires to connect to the ends of the resistance coils are brought through small holes drilled through the inner wall of the container. These holes are then sealed with gum shellac. No oil or other cooling liquid is put in this container, and the standards quickly come to the temperature of the oil bath in which they are measured.

A number of these new 1-ohm resistance standards have been constructed and are now under observation at the bureau. It is expected that the unit of resistance will be maintained with a group of these standards if they continue as stable in resistance as they have been so far. They have already proved their superiority in international comparisons, as they appear to be free from the change of resistance during shipment which occurred in sealed standards of the Rosa type.

MISLEADING DISPLAYS OF BEEF CUTS CONFUSE PURCHASERS

Federal Stamp Aids Consumer and Livestock Producer to Identify Grade and Quality of Beef

By W. C. DAVIS, *United States Department of Agriculture*

Probably no food product possesses a greater range of quality than beef, as the term is generally used.

Recent investigations show that the great majority of consumers do not know how to select beef on the basis of quality. This condition has become intensified because of misleading meat displays, and misleading advertising regarding its quality. As a result consumers become confused, and while they long for an appetizing steak or roast, they hesitate "to take another chance."

This is largely because consumers have not been clearly informed about beef and the factors which insure its satisfactory quality. Beef of the best quality must be from a well "finished" animal. "Finish" in the live animal means that the meat from that animal will be interspersed with white fat particles. The presence of firm white fat in beef is a sure indication of high quality. It contributes to tenderness and palatability.

Best quality in beef implies full, firm muscular tissue or flesh with a minimum of strength in fiber and connective tissue. Beef of this sort possesses a high proportion of juice to dry fiber, but this moisture must be of such consistency that the flesh when chilled remains firm and resilient. The cut surface of this beef has fine grain and is smooth and velvety to sight and touch. The color is a light or cherry red. The cut surface also presents a sheen or reflection not apparent in beef of poorer quality which is relatively dry or watery, and of coarser fiber.

All lean beef, however, will not make satisfactory roast and steaks, because it lacks the essential elements which contribute to tenderness and palatability. Yellow fat, and particularly soft yellow fat, indicates low quality. It is generally associated with cow beef and more specially with beef from dairy cows. Generally these are not slaughtered until after they have ceased to be economical milk producers, hence have passed the age when it might be possible

to convert them into satisfactory meat cuts for the table.

Because of these conditions and the uncertainties which accompanied consumers' beef purchases the Government Beef Grading and Stamping Service was instituted. This service was inaugurated May 2, 1927, at 10 of the larger slaughtering centers. The service has since been extended to seven more large markets. The grades in order of excellence are: Prime, choice, good, medium, and common.

Beef carcasses and cuts are graded and stamped at the packing plant by official beef graders. Beef is graded on the basis of conformance, finish, and quality, and every official grader has been thoroughly trained in Government grade standards. Beginning at the hind shank, a continuous ribbonlike imprint is made on each side of the carcass. The stamp is so placed that at least a portion of its imprint is left on each retail cut. Both class and grade are shown; for instance, a steer carcass carries the word "steer" evenly spaced and followed by the grade term. The ink used for stamping the beef is a pure vegetable compound and is entirely harmless.

It has now been definitely proved that such a service is not only practical and workable, but that it is essential to both consumers and livestock producers. It is essential to consumers in that it provides a means of identifying the grade or quality of the beef which they purchase. They are no longer compelled to rely on the judgment or advice of the individual market man. The Government grade stamp on the beef is the Government's statement of quality to the consumer.

The grading and stamping service is essential to livestock producers because it eliminates possible substitution and misrepresentation in the sale of their products to consumers. Those who produce the better grades of beef do not have to come into competition with those who produce the poorer grades; their products are sold for exactly what they are, because the grade stamp indicates their quality.

INTERNATIONAL STANDARD ATOMIC WEIGHTS FOR 1931

The publication of a new revised table of atomic weights of the chemical elements is an event of unusual importance. The 1931 report of the International Committee on Atomic Weights of the International Union of Chemistry was issued on May 6, 1931, by G. P. Baxter, chairman of the committee. It is printed in the May issue of the *Journal of the American Chemical Society*.

The table contains an alphabetical list of the officially accepted names of the chemical elements, and the symbol, atomic number, and atomic weight of each. The atomic number is simply the serial number in the table of the 92 chemical elements beginning with hydrogen, No. 1, and ending with uranium, 92. Atoms

numbered 43, 61, 85, and 87 are not included in the official table as they are either undiscovered or their discovery has not yet been adequately demonstrated and accepted.

The atomic weight is the average atomic weight of the atoms of an element. Even for the same element the atoms may differ in weight. The individual atoms all have whole numbered or nearly whole numbered atomic weights (based on oxygen=16.0000 as standard). The irregular proportions of these whole numbered atomic weights make the usual average atomic weight fractional.

While the atomic number is the one and only distinctive characteristic of all the atoms of a given element, the average atomic weight is still the practical datum required in chemical analyses.

STREET SANITATION

Rapid Growth of Cities Creates Complex Problems for Sanitation Officials

By DONALD C. STONE¹

Street sanitation officials are finding themselves in charge of highly complex and technical activities due to the fact that during the past few years cities have grown tremendously in both area and population. The demands of citizens that their city governments dispose of all types of municipal waste have added new burdens. In brief, sanitation officials find that instead of a simple problem which confronted them a few years ago they now face the intricate problem of management; that is, the organizing of men and putting machinery and materials into effective service.

As in all undertakings which rely upon a combination of men, machines, and materials, the street sanitation official must receive a continuous stream of information concerning his work and what it is costing. He must know how much work is being produced; that is, how many miles of streets are cleaned, how much refuse is removed, etc. He needs to know the extent to which work accomplished conforms to work planned, if new methods of work or equipment are actually more effective than those replaced, and the difference in costs of various methods and machines.

Standard measures needed.—These questions can not be answered without the use of measures. We need to measure the amount of work performed, the efficiency with which it is performed, the cost, and the quality of results obtained. To be of value such measures should be uniformly prepared and employ well-defined work units which mean the same thing on one occasion as on another. Lineal measurement would be absurd if a foot meant 10 inches to one, 12 to another, or 15 to a third. Likewise, in street sanitation unless the work units for streets cleaned or for refuse removed mean the same thing each time they are applied, either in one city or in several cities, the units are meaningless as measures of work accomplished. Or, if the same classes of expenses are not included in cost statements they are robbed of all value as measures.

Work of the Committee on Uniform Street Sanitation Records.—Appreciating this evolution in the technique of street-sanitation work and the need of standard measures for determining work performed and costs, a Committee on Uniform Street Sanitation Records has been established by the International Association of Public Works Officials (formerly the International Association of Street Sanitation Officials), in conjunction with the International City Managers' Association, the National Committee on Municipal Standards, the American Municipal Association, the American Public Health Association, the American Road Builders' Association, the American Society of Civil Engineers, the American Society of Municipal Engineers, the Governmental Research Association, and the National Municipal League.

This committee has already published a tentative report, entitled "The Measurement and Control of Municipal Sanitation," which discusses generally the need for standard measures and costs, and how they may be applied to the benefit of the sanitation official. The final report of the committee's work is now under preparation and will describe in detail the work units and unit costs which will be established as standard throughout the country, and just how these measures can be utilized into daily, weekly, monthly, and annual administrative reports. The committee's report will also describe how a scientific work program and budget is devised and how these instruments can operate to control the work of sanitation operations.

Many officials have suggested that a central clearing house be established to collect information from each city concerning its work, cost, and other pertinent information; all to employ the standard units and standard schedules. The committee is hoping to make possible the establishment of such a clearing house.

Value of standard measures.—The word "standard," as employed by the Committee on Uniform Street Sanitation Records, differs somewhat from the ordinary understanding of this word in commercial practice. The attempt at this stage is not to standardize materials, articles, and equipment employed by sanitation officials, but rather to standardize their methods of gathering information and of measuring their activities. This sort of standardization will make it possible to compare the methods in one city with those in another and to make it possible for one official to benefit by the experience of others since they can present the products of their experience in comparable form. Ultimately, as certain types of commodities and equipment emerge as the most economical and practical, the way will be paved for standardizing them.

Unit cost standards.—Perhaps the most unusual feature of the committee's work is the attempt to establish a unit cost standard. This standard is not a specific unit cost for an operation which may serve as a goal for every sanitation department in the country. Unfortunately, the conditions and problems facing each department are far too varied to permit such a simple measure as this.

However, unless the sanitation official can compare his costs and other statistical measures with some standard, their value is greatly reduced. He may compare them with costs in previous months or years, but there is nothing to show him that the previous figures were any more indicative of efficiency than the present ones. Without knowing what his costs should be, there is no way for the official to measure his current results or to control the various expenditures entering into these costs.

As an alternative to a cost standard of nation-wide application, the committee proposes that the above problem be met, in part, by each sanitation official

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establishing a standard cost for each operation in his city. These standard costs may differ in dollars and cents from one department to another, although the same procedure is followed in devising them. They correspond generally to the standard costs as employed in industry.

The work program and budget.—These standard measures of work performed and unit cost standards have particular value in formulating a work program for the year. In the past, public officials have estimated their budget needs on the basis of how much money was spent for particular objects during past periods. Seldom have their estimates been based upon a definite program of work to be performed. Obviously, the preparation of a budget under such conditions is merely guesswork.

In place of this, the committee recommends that a very carefully prepared program of the work shall

be formulated at the beginning of the year which shows the exact amount of work of each variety to be done, the time at which it is to be done, and the estimated unit costs and total costs for doing it.

This estimated cost is the unit cost standard described above. Once the work program is prepared, the financial budget can be constructed. This budget will enumerate the expenditures required to execute the work program using an object classification; that is, personal services, contractual services, materials and supplies, etc. The budget will also state the source of revenue for financing these operations which should be, in this case, appropriations from the general fund. During the year the periodic work and cost statements will indicate if the actual results conform to the estimated and the unit cost standards. This will furnish the official with an excellent tool for controlling his day-to-day operations.

TENTATIVE STANDARD SOUGHT FOR MINERAL WATERS AND SHELLFISH

Resolutions providing for the formulation of a plan for safeguarding the production and distribution of shellfish, and to work out a tentative standard for potentially dangerous mineral waters sold from various commercialized springs and wells in the country, were adopted April 30, 1931, at the closing session of the conference of State and Territorial health officers in Washington.

The resolution to safeguard present measures regarding the distribution of shellfish requests that the United States Public Health Service develop a definite scheme or table for rating the sanitary control over the production and the handling of shellfish. This table or plan is then to be submitted to the producing States for their approval.

The second resolution provides that the Surgeon General of the Public Health Service shall be notified of the advisability of working out a method to set up standards of what shall constitute potentially dangerous mineral water, these standards to be based upon suggestions submitted to him.

Sanitary Engineer R. E. Tarbott, of the Public Health Service, read a paper on A Proposed Method of Reporting Efficiency of State Control Over Shell-

fish Sanitation, and the resolution calling for the working out of such a plan was adopted after his proposals had been discussed by other delegates.

State health departments should work with the Federal Food and Drug Administration in enforcing regulations regarding mineral waters bottled and shipped at approximately 400 wells and springs in the United States, W. S. Frisbie, chemist in charge of the office of cooperation, Food, Drug, and Insecticide Administration of the Department of Agriculture, told the conference.

Before making his paper, entitled "The Coordination of the Sanitary Control of Bottled Mineral Waters," available to delegates, Mr. Frisbie outlined the work of his bureau in prohibiting the adulteration or the misbranding of bottled mineral waters. Samples of such water first are obtained at their source. Afterwards, he explained, the bureau is constantly collecting samples in the open market. However, inasmuch as the Food, Drug, and Insecticide Administration has no sanitary engineers, the cooperation of State health departments which do have sanitary engineers is necessary in the work of controlling mineral waters, according to Mr. Frisbie.

STANDARD THICKNESS OF LEATHER RECOMMENDED

A conference held at the Roosevelt Hotel, New York, N. Y., on April 28, 1931, representing all interests of the bag, case, and strap leather industry, recommended for universal adoption a standard covering the selling thickness for bag, case, and strap leather.

The conference was called by the division of trade standards, National Bureau of Standards, at the request of the Bag, Case, and Strap Leather Group of the Tanners' Council of America, who formulated the proposed standard for the purpose of eliminating the confusion and misunderstanding that has hitherto existed in the purchase and sale of bag, case, and strap leathers.

Four methods of designating thickness are set forth in the standard as recommended by the conference.

The term "ounce," because of its long and general use in the industry, is regarded as the preferred term. For those familiar with the metric system and for use in export trade, the thickness is designated in millimeters. A designation—64ths of an inch—is included for use by the layman unfamiliar with the terms of the leather industry, and the fourth designation of thousandths of an inch is included for the use of those buying or selling by this unit. The instrument recommended for determining the thickness of bag, case, and strap leather is the Woburn Leather Gage, or its equivalent, accurately calibrated in the four thickness designations.

Those interested in bag, case, and strap leather may obtain mimeographed copies of the recommended commercial standard by addressing the division of trade standards, National Bureau of Standards, Washington, D. C.

STANDARDS FOR TRANSMISSION OF SPEECH

Industry Adopted Reference Circuit 25 Years Ago

By WILLIAM H. HARRISON, *American Telephone & Telegraph Co.*

Since the earliest days of the telephone, the need for a unit in which to measure the transmission efficiency of telephone facilities has been recognized. The introduction of cable in 1896 afforded a stable basis for a convenient unit and the "mile of standard" cable came into general use shortly thereafter. This unit was employed up to 1923 when a new method of designating the efficiency was adopted as being more suitable for modern telephone work. The new method involves the use of a term widely employed by foreign telephone organizations, which recently was given the name of "decibel" at the suggestion of the International Advisory Committee on Long Distance Telephone.

As employed in telephone engineering, the decibel may be defined by the statement that two amounts of power differ by 1 decibel when they are in the ratio of $10^{0.1}$ and any two amounts of power differ by N decibels when they are in the ratio of 10^N ($10^{0.1N}$). The number of decibels expressing the ratio of any two powers is, therefore, ten times the common logarithm of that ratio.

This method of designating the gain or loss of power in telephone circuits permits direct addition or subtraction of the units expressing the efficiency of different parts of the circuit and is therefore especially advantageous in facilitating the design and maintenance of the telephone plant. The decibel is also of particular advantage in that, being based purely on power ratio, it has the same value for the same ratio at different frequencies. The "mile of standard" cable, because of its distortion characteristics, expressed a different ratio of power at different frequencies.

As a basis for expressing transmission efficiency, a standard reference circuit was adopted about 25 years ago, the circuit consisting of standard commercial transmitting and receiving equipment, cord circuits, and an artificial line variable in equivalent length. Improvements in the art during recent years have permitted the replacement of the older reference system with a new circuit which is substantially free from distortion.

This new "master reference," as it is called, consists of transmitting and receiving elements interconnected

by a variable artificial line. The transmitting element of this reference system consists essentially of an air-damped condenser type transmitter with a stretched duralumin diaphragm and an associated vacuum tube amplifier. The receiving element is composed of an air-damped receiver of the moving coil type and an associated vacuum tube amplifier.

The connecting line or attenuating element is composed of a distortionless resistance line with a variable range from 0 to 101 decibels in steps of 0.2 decibel. The transmitting and receiving elements both have electro-acoustic characteristics that are substantially distortionless and, as the impedance of the different elements are matched, the air-to-air reproduction ratio is practically distortionless.

The electrical and acoustic specifications of all parts of this master reference system are defined and measured in terms of definite physical quantities and every part of the system can, therefore, be exactly reproduced from the specifications. Each element is also provided with suitable adjustments for maintaining the standard of performance as determined by measuring and calibrating equipment associated with the system.

The artificial line can, of course, be calibrated by common methods. For the basic calibration of the transmitting and receiving elements, however, a thermophone is employed. This instrument expresses a definite relation between electrical input and acoustic power and is itself capable of specification in definite physical constants.

In order to facilitate the measurements of commercial circuits which are not free from distortion, provision is made in the master reference system for the insertion of distortion net works.

This master reference system has also been recently adopted by the International Advisory Committee. By the adoption of the same reference system throughout the world and similar or comparable transmission units, a very great step has been taken toward the development of generally accepted world-wide standards of reference for all measurements relating to telephone transmission. In view of the rapidly expanding scope of intercontinental telephony at this time, it is particularly fortunate that these common standards have been adopted.

BROOM BUYING MADE EASY

Brooms, because of their farm ancestry, are now among the commodities labeled according to standards set by the United States Department of Agriculture. By a decision of the Broom Institute (Inc.), recently organized in New York, N. Y., under the auspices of the National Standards Council, all brooms made by member manufacturers must conform to comparable standards for broomcorn.

These broomcorn standards are among the many drawn up by the Department of Agriculture in the last 15 years to help the farmer get prices commensurate

with the quality of his products, and to provide a reliable guide for buyers.

Under the new standards household brooms are in three general grades; supergrade, made from selected, fine-fiber A quality broomcorn; fancy grade, made from the regular run of A quality broomcorn; and service grade, made from B quality broomcorn, which although not so good as A quality, is still of high quality. Warehouse and industrial brooms come in two grades; service grade, for which B quality broomcorn is specified; and utility grade, for which C quality broomcorn (sound, serviceable broomcorn, but with certain defects) is used.

FINNISH STANDARDS ASSOCIATION

Scope of Association's Functions Reviewed

By A. WILLBERG, *Secretary Finnish Standards Association*

When the Finnish Standards Association was started in 1924, it concentrated principally on solving the problems of mechanical engineering. Such restriction of its activities was a natural outcome of the development of standardization in Finland.

The formation of a standards organization was the work of our leaders in engineering who subsequently gave the organization the greatest support both in labor and finance. The association intended to cover all branches of trade, and thus become a central body in which all standardization work in the country would be concentrated.

The standardizing work of the Finnish Standards Association at present embraces mechanical engineering, electrical engineering, the paper trade, fire-fighting technology, packing, and the graphics industry. The work is carried out partly by committees appointed by the association and partly by the standards office. An exception is the committee for standardizing agricultural machinery, which was appointed by the Central Union of Agricultural Producers in Finland. During the past few years, however, the work has been taken over more and more by the office of the association, as the voluntary committees work too slowly.

In mechanical engineering the work includes basic standards, machine parts, piping, transmissions, and agricultural machinery. Machine parts, among which screws, nuts, rivets, wedges, etc., are now ready, form the largest category. Among transmission standards, bearings and accessories have received most attention. Only the main dimensions for piping have been standardized, but other factors are being considered. The standardization of agricultural machinery is still in a preparatory stage. In working out these standards, chief attention has been paid to reducing the number of types and insuring interchangeability. Only in isolated cases has the work been extended to include specifications as to quality and workmanship.

Standards in electrical engineering have been confined exclusively to rules governing the installation and safeguarding of electrical apparatus. These are collected in a book published by the electrical inspectors. In the paper trade the standards embrace the system of dimensions for finished sizes and their uses; that is, for letters, envelopes, blank forms, etc. The projects in preparation refer to specifications of quality, weight, and testing.

Standards for fire hose and couplings are almost ready. Preliminary work has also been done in standardizing the various kinds of fire engines, both hand and motor, and in drafting rules governing the materials to be used for fire-extinguishing apparatus. For packing there are two standards, one for whortleberry cases and one for moss cases, worked out with a view to exports. The standards for the graphics industry refer to certain letter types, pictures, and signboards.

Besides strictly standardization work, the association has conducted investigations, so far as time and means permitted, which should act as a basis for future work. These studies have dealt with agricultural im-

plements, iron and steel qualities, tar and turpentine qualities, mathematical and physical units, mathematical tables, standard figures, etc. Further, the association has kept in touch with international standardization work and has dealt with such questions as affect Finnish interests.

Altogether the approved standards number 195 and the projects being worked out number more than 500. The following table gives an idea of the distribution of the work in different groups:

Industrial groups	Approved	In preparation
A. General standards.....		25
B. Mechanical engineering.....	163	250
C. Electrical engineering.....	1	100
H. Materials.....		50
K. Chemistry.....		5
N. Agriculture.....		20
P. Paper.....	3	20
Z. Miscellaneous, fire-fighting equipment, packing, etc.....	28	40
Total.....	195	510

In addition to the continuation of work already started, efforts are being made to extend the association's activities into new fields. It is proposed, for instance, when circumstances and funds allow, to broaden the work in mechanical engineering to include fittings, machine tools, textile machinery, hoisting machinery, and welding technology.

In the immediate future electrical engineering work will deal with electric machinery, transformers, installation material, wires and cables, etc. The standardization of sizes is of particular interest in the paper trade. With regard to fire-fighting technology, it is proposed to standardize all kinds of equipment.

Among the new projects considered for standardization are agricultural, building, woodworking, and the metal trade. The chemical industry, the glass and pottery trades, and transport have also been considered, all of which are in great need of standardization.

In particular the work in the agricultural field is receiving the greatest attention. As this will include machinery, implements, and specifications of materials, as well as quality and packing of agricultural products, the first steps in this direction will consist in centralizing the work.

Building trade.—In the building trade work will begin by standardizing doors, windows, moldings, fittings, etc., and extend it later to other building equipment and materials. Standards for drainage, road and bridge construction, etc., are also proposed in this connection.

Woodworking industry.—In developing standards for the woodworking industry, uniform dimensions, for both sawn and planed timber, is the first problem to be studied. In the metal trade the work is to include specifications of quality and testing of iron and steel.

As the committees are proceeding cautiously, a reorganization of the method of work has been suggested. Accordingly, committees will act only as advisory and criticizing bodies. The actual work will be performed by the association.

The realization of the plans of the Finnish Standards Association depends principally upon financial support, both State and private. Up to the present, State support has amounted to Fmk. 100,000 annually, and private contributions to about Fmk. 70,000 a year. In addition, certain individuals have contributed their services. By exercising the strictest economy these funds have sufficed to maintain the work in its present extent, but not without some sacrifices so far as thoroughness and effectiveness are concerned.

In comparison with other countries, the Finnish association functions with the smallest funds. For

instance, the support granted to the standards association in Sweden is Sw. Cr. 52,000; in Norway, N. Cr. 13,000; in Denmark, Dr. Cr. 19,325; private support in Norway amounts to N. Cr. 27,000; in Denmark, D. Cr. 19,000; and in Sweden, Sw. Cr. 7,500; in cash besides volunteer work. Accordingly, the plans carried out in Finland demand annually about Fmk. 400,000; of which amount the State should contribute at least Fmk. 250,000.

Regulating production and consumption on a proper basis is generally known under the name of rationalization and is strongly supported everywhere by State and private interests. The Finnish Standards Association is convinced that responsible circles in Finland will promote greater understanding in standardization. This will constitute an important link that will eventually benefit the whole country.

SIMPLIFYING TRUNK SIZES AND WOMEN'S SUITCASES

The trunk, luggage, and leather goods manufacturers of America, recognizing the commercial value of establishing a simplified list of sizes for trunks, appointed a committee to study the problem as it related to the range of sizes necessary to meet public needs. It was felt that a simplified schedule of sizes would effect economies to the merchants in continually carrying a complete stock at a minimum investment and that the manufacturers would likewise benefit in a reduction of numbers of models and standardization of parts.

The industry has felt that the great variety of sizes in which trunks and hand luggage are produced has acted as a drag on the advancement of the trade, according to Stanley Klein, chairman of the committee. He pointed out that it was the belief of some of the leaders of the industry that the simplification of sizes would aid the manufacturer in solving his production problems.

The work of the committee was brought to a conclusion on May 11, 1931, when a general conference of the various interested groups—manufacturers, distributors, and transportation officials—met in Washington to consider a proposed program of trunk sizes, and also a simplified schedule of sizes for women's suitcases. Both recommendations were approved by this conference, and will now be circulated among the trade for written acceptance.

W. E. Braithwaite, representing the National Bureau of Standards at the conference, said that the membership of the standing committee for the respective simplified practice recommendations would be announced by the bureau at the time of circularizing the industry for acceptance. In discussing the effect of the conference in developing the two recommendations, Mr. Braithwaite said that "the adoption of a standard of practice is a constructive step, but unless the industry through a representative standing committee continues its efforts with a periodic audit to ascertain the degree of adherence, and unless the manufacturers, distributors, and users make every effort to conform to the schedule, the maximum benefits inherent in the program will not be realized."

GAGES FOR SHEET METAL

Stock sizes of metal sheets and plates are based either on definite thicknesses or definite weights per unit area. Such a list of thicknesses of weights constitutes what is known as a "gage."

In the United States there are several gages in use for sheet metal, a situation which frequently causes confusion and inconvenience in the trade. In order that definite information covering the entire field might be available, the National Bureau of Standards has issued Circular No. 391, which presents customary practice as to standard thicknesses, weights, and tolerances of sheet metal. It is not the purpose of the circular to promulgate standards, although some of the gages included are officially recognized standards, but merely to make readily accessible information as to current practice.

The gages dealt with are those which apply to the following metals and alloys: Wrought iron, steel, commercially pure open-hearth iron, saw steel, zinc-coated or galvanized iron and steel, tin plates, terneplates, copper, aluminum, brass, and other nonferrous alloys, Monel metal, zinc, and lead.

The circular also includes gages or stock lists for sheet metal widely used in Europe, particularly England, France, Germany, and in Japan. Copies may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 10 cents each.

SURGICAL GUT

A meeting of leading manufacturers of surgical gut, representing 85 to 90 per cent of production, met in New York, N. Y., on April 29, 1931, to consider a tentative draft of a commercial standard for surgical gut, prepared by the American Hospital Association.

The specifications were reviewed in detail at this meeting and some changes recommended. The manufacturers requested that some policing agency be set up to insure adherence to the standard, and individuals were designated to approach the American Hospital Association, the American College of Surgeons, and the American Medical Association to seek the cooperation of these bodies to that end.

SIMPLIFICATION BRIEFS

Steel barrels and drums.—Simplified Practice Recommendation R20-28, Steel Barrels and Drums, has been reaffirmed by the standing committee of the industry, without change, for another year, according to an announcement by the National Bureau of Standards. This simplification program has been instrumental in reducing the number of varieties of steel barrels and drums from 66 to 25, or approximately 62 per cent.

Cut tacks and small cut nails.—It has just been announced by the National Bureau of Standards that Simplified Practice Recommendation R47-28, Cut Tacks and Small Cut Nails, has been reaffirmed by the standing committee of the industry, without change, for another year. This recommendation has been instrumental in reducing the number of sizes of cut tacks and small cut nails from 421 to 182, or approximately 57 per cent; and packing weights from 423 to 121, or 71 per cent.

Adhesive plaster.—Simplified Practice Recommendation No. R85-28, Adhesive Plaster, has been reaffirmed by the standing committee of the industry, without change, for another year, according to an announcement of the National Bureau of Standards. This recommendation, which was instrumental in effecting a reduction in the number of rolls of adhesive plaster from 3 to 2, and in reducing the number of widths of spools from 8 to 5, and their lengths from 23 to 13, has been in effect since September 1, 1928.

Refrigerator ice compartments.—The National Bureau of Standards announces that Simplified Practice Recommendation R109-29, Refrigerator Ice Compartments, has been reaffirmed by the standing committee of the industry, without change, for another year. The recommendation covers capacities and dimensions of ice compartments for two types of domestic refrigeration known as side icers and front icers. Copies of this recommendation may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., for 10 cents each.

Skid platforms.—The revision of Simplified Practice Recommendation R95-30, Skid Platforms, is now available in printed form, according to an announcement by the National Bureau of Standards. This recommendation (copies of which may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., for 5 cents each) provides for the clear height from the bottom of runners

or other supports to underside of platform; the minimum horizontal distance between inside of runner or other supports, and for the over-all dimensions for platforms of the Nos. 1 and 2 skids.

Packaging of dental plaster, investment, and artificial stone.—Simplified Practice Recommendation R117-30, Packaging of Dental Plaster, Investment, and Artificial Stone, is now available in printed form, according to announcement by the National Bureau of Standards. Copies of this recommendation, which has been instrumental in reducing the number of package sizes of dental plaster from 22 to 3, and dental investment from 26 to 13, can be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., for 5 cents each.

Loaded paper shot shells.—It has just been announced by the National Bureau of Standards, that the revision of Simplified Practice Recommendation R31-30, Loaded Paper Shot Shells, is now available in printed form. Prior to the adoption, by the industry, of the original draft of this recommendation, 4,067 different loads of paper-shot shells were in existence. Since that time, the recommendation has been revised on four occasions. In the current edition of the recommendation, 343 different loads are listed. The total reduction in variety is approximately 91 per cent. Copies of the revised recommendation can be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., for 5 cents each.

Color for school furniture.—According to announcement by the National Bureau of Standards, Simplified Practice Recommendation R111-30, Color for School Furniture, has been reaffirmed by the standing committee of the industry, without change, for another year. The color for stock varieties of school furniture, as established by the recommendation, is known as school furniture brown. The industry has fixed light and dark limits of shades within this color and, while any shade within these limits will be considered as conforming with the requirements for school furniture brown, it is understood that every effort is to be made by the industry to conform as nearly as possible to the selected median shade. Master color blocks, selected by the industry as representing the permissible range of shades of this color, shall be used in the preparation of duplicate color blocks for matching in manufacturing and for sales purposes.

FEDERAL SPECIFICATIONS

Status of 13 Projects Announced

The Federal Specifications Board submitted 13 specifications, proposed for revision, to the interested Government departments, bureaus, and other establishments, for criticism and comment, during the month of May. Copies of the proposals, in mimeographed form, may be obtained from the Federal Specifications Board, National Bureau of Standards, Washington, D. C.

Designation	Specifications	F. S. No
W-F-801.....	Fuses, cartridge, inclosed, renewable.....	176
QQ-I-666.....	Iron, malleable, castings.....	378a
QQ-I-676.....	Iron, pig, foundry.....	126a
RR-C-271.....	Chain and attachments, standard, miscellaneous.....	348
ZZ-B-111.....	Bands, rubber.....	64a
ZZ-H-421.....	Hose, chemical.....	47
ZZ-H-521.....	Hose, spray.....	45
CCC-C-521.....	Cloth, shade.....	
JJJ-P-791.....	Pumpkin, canned.....	629a
JJJ-S-71.....	Sauerkraut, canned.....	630a
JJJ-S-611.....	Spinach, canned.....	631a
JJJ-T-571.....	Tomatoes, canned.....	632a
	Prunes, evaporated (or dried).....	634a

DETAILED SPECIFICATIONS ADOPTED BY INDIAN SERVICE

Use of Definite Specifications Has Resulted in a Closer Understanding Between Various Industries and Indian Service

By W. B. Fry, Chief, Purchase Division, Bureau of Indian Affairs, Department of Interior

Slowly, perhaps, but with a decidedly forward trend, the development and use by the Indian Service of the Interior Department of detailed specifications in the purchase of articles of supply, equipment, etc., has become an active feature of its operating program.

Those familiar with conditions existing in that service some years ago must realize how indefinitely and inadequately procurement specifications were prepared in those days. The article to be purchased was merely named and usually samples were called for, leaving it more or less to the election of the prospective bidder to determine the character and quality he should offer. The awarding official made his selection from what was placed before him.

Much latitude, therefore, was given him both as to the determination of the "acceptable quality" and as to the rejection or acceptance of bids based upon that determination. It was customary for him to proceed in the consideration of the proposals from the cheapest sample offered to the point where a selection could be made of the commodity which, in his opinion, was adequate to the requirements of the Indian Service both in quality and in price. Consequently, the procedure developed into simply a matter of personal preference. Some other official, under exactly the same conditions, probably would have made a different selection.

The inadequacy and unfairness of any system of purchasing on sample without an accompanying detailed description of the article to enlighten the bidder as to what is wanted and at the same time fix for the awarding officer a standard by which he shall be guided in making the award must be apparent to everyone. Such a system was altogether too indefinite and unsatisfactory to both the Government and the bidders to justify its continuance.

While this system was followed in the Indian Service there was a decided tendency to buy the cheapest article offered. For the purchasing officer who did not have to consume or use the article bought, that was the simplest thing for him to do and in doing that he avoided arguments with both the accounting officials and the lower bidders whose proposals might, under a different system, be rejected. It needs no particular imagination to picture the results of such a policy and the reaction of those who were required to get certain results from inferior equipment, stores, etc.

It was recognition of the failure of the cheaper lines of goods to meet the conditions under which they were to be used that created a strong desire to improve their quality, which could be done only by selecting standards in the various items and drafting more or less detailed descriptions thereof that would justify the elimination of proposals on merchandise inferior to those detailed specifications. Progress necessarily was slow because of the always pressing necessity for making the available funds stretch as far as possible; nevertheless, the improvement was steady.

Supporting the desire for better merchandise and the necessity for eliminating proposals on the in-

ferior lines, in order that definite standards of quality might be maintained, was the attitude of the Comptroller General of the United States against the elimination of low bids unless the articles bid on failed to measure up to the requirements of the advertisement.

If no standards were set in the advertisement the natural inference was that anything would do and very properly the Comptroller General has ruled that the cheapest bid should be accepted. It became more and more difficult for the awarding official to eliminate the low bids successfully when the determination was based merely upon the opinion of that official that the low bids were not acceptable because they represented something that was inferior to his needs.

As a measure of protection to himself it became necessary to fix, by means of detailed specifications, minimum standards upon which bids on articles not meeting those standards might properly be eliminated. It developed that when proper specifications were prepared, samples in many instances would not be required in support of the proposals but, if still desired, the number and type would be considerably reduced because of the elimination of "guessing" on the part of the bidder which caused him to submit numerous samples on the same item of different types and qualities, in order that he might meet all possible contingencies that might arise in the mind of the awarding officer. On the other hand, it became evident that, if samples were not to be called for, it was absolutely essential that each job specification should be descriptively complete in itself.

The Indian Service now has a fair group of detailed specifications of its own, in addition to the mandatory Federal specifications and those which have not been made mandatory, except for military units, but which are utilized because they provide for grades and qualities of articles procurable at prices which that service can afford to pay. It not only has developed these specifications for itself, but has called on experts for various industries and from other branches of the Government to assist in the preparation, and also has adopted the specifications of other Government branches when deemed suitable to its needs. Cooperation between the administrative branch of the service and the purchasing branch has developed very definite ideas as to what the Indian Service needs and can afford to buy, and it is only necessary that those ideas be expressed in concrete form in order to develop suitable job specifications.

The use of definite specifications has resulted in a closer understanding between the various industries involved and the Indian Service. Confusion of ideas on the part of the bidder as to what was the most suitable thing to offer and on the part of the contracting officer as to what was the most suitable thing to buy has been eliminated.

The expense to the bidder of submitting numerous samples of different quality and price on the same

article has, likewise, been eliminated. The opportunity to bid for those who handle only the cheapest grade of an article is no longer present when a better quality is desired. The improved quality of merchandise purchased gives to the Government more for the money invested and the units for which the articles are purchased are greatly benefited thereby through the greater service obtained.

Likewise, definiteness as to what is required encourages bidders of the more desirable class to quote and, last but not least, the service has in advance of

the purchase a mental picture of what it is going to get even before the bids are opened. The Indian Service is conscious of greater security, to say nothing of satisfaction, through the use of detailed specifications as compared to any other method of purchasing, and will continue to produce new specifications as it has opportunity and time to do so.

To that end, within the purchase division of the Indian Office, there has been created a committee whose special duty it will be meet regularly for the purpose of producing additional job specifications.

AMERICAN NATIONS SEEK UNIFORM PRACTICE ON BILLS OF LADING

Commerce Conference in October to Consider Legislation on Practices of Shippers

To make uniform the practices of the 21 American republics in respect to bills of lading, legislation on this shipping document will be discussed at the Fourth Pan American Commercial Conference, October, 1931, in Washington. This subject has recently been added to the program of the conference (announced in *Commercial Standards Monthly*, May, 1931) and will round out that portion of the agenda devoted to national and international juridical problems at present affecting trade between American nations.

Business leaders from all the American countries are expected in Washington for the conference, which will meet the week of October 5 to 12, under the auspices of the Pan American Union. Discussion of uniform legislation on bills of lading will be welcomed, especially by shippers and exporters who will have an opportunity to express their views from the practical side of the subject. In addition, the Inter-American High Commission has drafted a project of principles for presentation to the delegates which embodies the most advanced ideas on this subject.

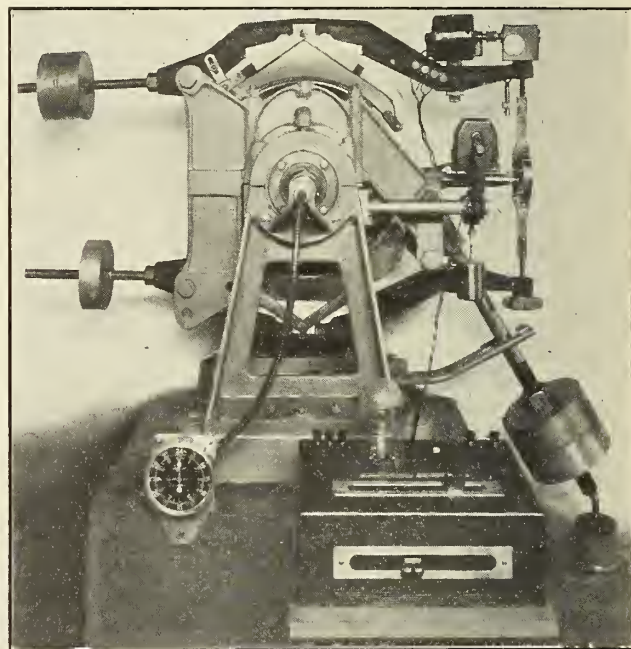
International action looking toward the unification of laws on bills of lading was taken at the meeting of the Fifth International Congress of Chambers of Commerce at Boston in 1921. This subject had been studied at the first meeting of the Inter-American High Commission in 1916, the second Pan American Financial Conference in 1920, and was discussed by the Committee on Maritime Law of the Association of International Law. In 1921 The Hague conference discussed and formulated a code embodying the provisions of the laws of the various countries. The provisions of this code, as modified by the International Convention at Brussels in 1922, are followed, in the main, in the Codes of Commerce of the American republics. However, interpretations of the principles vary, and some of the codes have omitted fundamental clauses. Therefore, the Inter-American High Commission, after studying the codes of commerce of the American countries and the laws referring to bills of lading in the United States, has drafted the project to principles noted above.

It is expected that definite action will be taken at the forthcoming commercial conference in an attempt to bring about unification in the legislation of the several American republics in those laws covering bills of lading. In addition to this subject, discussions of

the questions of uniformity of consular fees and the simplification and standardization of consular procedure are also expected to prove of importance to shippers and foreign traders in general.

DEVICE TO TEST AUTO BRAKES

The Federal Government is interested in brake linings that will give satisfactory service in the great variety of motor vehicles included in its fleet. Tests by the National Bureau of Standards to provide comparative ratings for all brake linings submitted for



approval are required under the Federal specifications. The test equipment, shown above, is built on the lines of a cradle dynamometer, so that the torque may be measured on the frame of the machine regardless of the method of drive adopted for the shaft carrying a brake drum. The oscillating frame carries the two pressure arms carrying a brake shoe. The pressure is applied by means of the adjusting linkage connecting the front ends of the upper and lower pressure arms; this includes a ring gage for measuring the tension in this linkage and from the reading of this gage the pressure on the shoe is computed.

THE AMERICAN SOCIETY FOR TESTING MATERIALS

The Development of Standards for Materials by the American Society For Testing Materials Outlined Step by Step

By R. E. HESS, *American Society for Testing Materials*

For 29 years the American Society for Testing Materials has been one of the leading groups engaged in standardization work. Its objects, as stated in its charter, are "the promotion of knowledge of the materials of engineering and the standardization of specifications and methods of testing." The society has striven earnestly to fulfill the statement of its purpose as given by its founders.

To-day the society has more than 4,400 members, including more than 500 in foreign countries. The members are drawn from all of the important industries of the country and fall roughly into three groups, namely, (1) producers of raw materials, semi-finished and finished products in the various fields covered by the society's activities; (2) major groups of material users, such as railroads, automotive industry, public utilities, etc., and all branches of the Government; and (3) general-interest group, including consulting engineers, testing experts, technologists, and scientists affiliated with the Government departments and technical schools.

The promotion of knowledge of engineering materials is effected by thorough investigations into the properties of materials by committees and members of the society, and by the joint researches of other groups, the results of which are presented at annual meetings as reports and papers which are discussed and subsequently published in the proceedings. The standardization of specifications and methods of testing is carried on through representative committees as described below.

The standardization work implies, in general, the development of methods of testing materials; the setting up of standard definitions and systems of nomenclature; the formulation of specifications defining the quality and tests of materials and products; and the preparation of recommended practices covering certain processes in the utilization of materials. The actual work of developing standards is assigned to standing committees which function under carefully prescribed rules. These committees are authorized also to conduct studies and research in the field of materials, many of which studies may be related to standardization. Their reports are made annually to the society, which has the final responsibility for the standard.

Only those standards for materials that are satisfactory to both producing and consuming interests can ever come into general commercial use. Accordingly, the society from the beginning adopted the principle that the producer and consumer of materials must be brought together upon an equal footing in committees that are to develop commercial standards for materials, and all such committees are made up on the basis of adequate representation in these two groups and a third, or "general interest" group, comprising independent authorities who have expert knowledge of materials to be studied, but who are not concerned directly with either production or use. The

producer group may not predominate on any committee.

Standards should be founded upon as accurate knowledge as possible of properties of materials and upon suitable tests for determining such properties. Finally, every opportunity should be afforded for all interests fully to express their views both in committees and before the society, to present data bearing upon standards in the course of development, and in every way to participate in the decisions that lead to standards. This is insured through the procedure that governs committee and society action on standards.

The steps in the development of a material standard may be outlined briefly: (1) It is necessary to agree upon acceptable methods for determining the various properties of materials. (2) There should be agreement as to acceptable definitions of terms relating to a particular group of materials involved. (3) The committee then discusses requirements of proposed specifications. Here full account must be taken of the influence of manufacturing processes, stresses, and other conditions to which materials would be subjected into service, etc. The committee must come to agreement upon the properties of the materials to be specified, methods of test, methods of inspection, marking, and so on. At times a compromise between the somewhat extreme views that may be held by producer and consumer is necessary in reaching a tentative agreement, although the more clearly problems involved are understood the more easily a logical agreement can be reached. (4) After full consideration at meetings and final action by "letter ballot" of the entire committee, the proposed standard is presented to the society for discussion and is published for a year as tentative, during which time it is on trial by industry. (5) When a tentative standard has been found acceptable it is proposed to the society membership as a whole at an annual meeting for adoption as standard. This requires a letter ballot vote of the entire society membership. (6) Each standard is in the hands of a permanent committee, responsible to the society for a particular standard. Therefore, revisions can be considered at any time. It is recognized that occasional revisions in quality standards are necessary to keep abreast of improvements in design, construction, or for other reasons. As a rule tentative standards are subject to revision annually but standards only once in three years.

The use of standards in industry must rest on the merits of the standards themselves and upon the fact that their formulation by producer and consumer has brought into existence an equitable standard that can be readily introduced to the advantage of both the buying and selling interests. The methods of test must be scientifically and technically sound and specifications must form an adequate basis technically and commercially for the exchange of materials.

The following are ways in which the standards of the society are used: (1) They are used without modification. (2) They are used by reference; for example, contracts will require materials to conform to certain A. S. T. M. (American Society for Testing Materials) specifications, which are then given by title. (3) Standards that are not adopted outright are used as the basis for specifications written by others. This is a very important use, since the setting up of the guide is in itself a tremendous factor in preventing great diversification. (4) The A. S. T. M. specifications have been expressive of American practice and have therefore been of particular value as standards for export business in materials. Foreign language editions of A. S. T. M. specifications have been distributed by the Department of Commerce throughout the world by means of its agencies in foreign countries, and they have been largely used by American industries engaged in export business.

The benefits to both producer and consumer for standard specifications that have been applied are very evident and convincing. There are certain advantages of particular importance to producers. As soon as a specification is accepted for a material, quantity production is possible; this results in lower prices. In times of general business depression when orders are low and buying is at a standstill the manufacturer can continue to produce "standard" material, knowing that when business picks up he will have a market for it. Such consideration is of great importance in that it substantially reduces the waste in industry resulting from excessive labor turnover, shutting down of plants, etc., and which in turn is an economic burden

upon the entire community. The adoption of standards reduces the variety of commodities that must be kept in stock. The producer knows exactly what he must furnish and how it will be tested and inspected by the consumer. This reduces misunderstandings to a minimum.

Benefits to consumer come, of course, indirectly from the items mentioned above and in addition others may be enumerated; for example, truly competitive bids on the same quality material can be secured, purchasing details are simplified and standardized, standard methods of test and inspection can be established as a routine procedure, thus insuring greater uniformity and reliability of standard material.

In its essentials standardization is simply a process of selection of types, designs, materials, or practices that in the course of time have thoroughly proved their value. It has been found that the introduction of materials standards prepared by the American Society for Testing Materials has conserved time and energy for the study of new developments and that standards of quality and tests for materials are readily modified to keep in step with the pace of industry.

The society is particularly qualified by the character of its membership and the support given to it by the industries throughout the country, its principles and procedures, and its experience for 29 years to develop standards for materials. It welcomes the cooperation of all groups desiring to engage in standards development and it affords an opportunity to participate in the formulation, in a thoroughly representative manner, of equitable materials standards.

VISUAL REED INDICATOR GUIDES AIRCRAFT

The visual reed indicator, developed by the National Bureau of Standards for the Aeronautics Branch of the Department of Commerce, is used in conjunction with a radiobeacon for guiding aircraft. It consists of two vibrating reeds tuned to the frequency of the modulated signals received by a special radio receiving set on the airplane.

When the two signals received are of equal intensity the reeds vibrate with equal amplitude. If the plane drifts to the left of its true course, the left-hand reed vibrates through a greater distance than the right-hand reed. In case the plane drifts to the right, the right-hand reed vibrates through a greater distance. These reeds, with their operating mechanism, are contained in a small case which is plugged into a socket on the airplane instrument board.

Only the ends of the reeds are visible to the pilot, and when vibrating have the appearance of two equal or unequal parallel white lines. These reed indicators are now in commercial production, and the National Bureau of Standards has been called upon to set up standard methods for testing them.

The bureau is therefore studying methods of adjusting and calibrating reed indicators and is trying to improve their performance. By using Allegheny electric metal (a nickel-steel alloy) for the magnets which cause the reeds to vibrate, the sensitivity of the indicator has been increased 100 per cent, which has resulted in an increased useful range or distance from the radiobeacon. This improvement also reduces in-

terference from radio stations. The necessary tolerances to be followed in constructing these indicators have been established so that satisfactory performance is obtained without undue expense.

It will be readily understood that the reed indications are reversed when flying toward or away from a beacon. Turning the case upside down, so that the left reed becomes the right reed, overcomes this difficulty and permits the pilot merely to remember "longest line shows side off course."

Specifications for construction of the reed indicators may be obtained upon application to the National Bureau of Standards, Washington, D. C.

MEN'S SHIRTS, PRESHRUNK

As a step toward standardizing the measurements of men's shirts, the National Association of Shirt Manufacturers has requested the division of trade standards of the National Bureau of Standards to survey the industry to determine the prevailing practice in respect to the dimensions of shirts made of preshrunk material, and the shrinkage limit of which it is practicable to maintain.

Studies made by textile laboratories have indicated that it is possible to maintain a shrinkage tolerance within 2 per cent. Accordingly, the National Association of Shirt Manufacturers proposes that a shrinkage tolerance not to exceed this amount be established in conjunction with the measurements of finished shirts. The manufacturers have been circularized for their reaction to these proposals.

LEAD PENCILS

Lack of Standard Laboratory Tests Prevent Development of Reliable Specifications

By C. E. WATERS, *National Bureau of Standards*

Even in these days of alluringly advertised automatic pencils there are conservatives who use the old-fashioned kind, to the number of several billions a year. They are doled out more or less freely at the office, and can be bought at innumerable stores, some for as little as 1 cent apiece. Pencils are taken for granted, and we rarely stop to think how much technical skill goes into their making, or by how many steps the finished article is removed from the raw materials. As for standardizing pencils—well, we usually prefer a No. 2, and like a certain brand best, but will take any other kind if we must, though it may be as hard as a No. 3 of the first brand.

Nobody knows who first discovered that a certain black, flaky mineral would make marks almost the same in appearance as those made by a piece of metallic lead, but when the discovery was made, the name that obviously fitted the mineral was "black lead." Later, it was called graphite, a name derived from the Greek *graphein*, to write, and *ite*, the usual terminal syllable in mineral names.

No doubt the first lead, or graphite, pencils were simply chunks of a convenient size, and were good enough in the days when memoranda were jotted down on the nearest flat rock. Not until the sixteenth century, when a deposit of unusually good graphite was found at Barrowdale, in England, was there any advance in the quality of lead pencils. This graphite was sawed into thin strips or rods, which were sold without any further treatment. This was a very wasteful process because graphite so easily flakes and crumbles. The grittiness of the pencils can be imagined. A step in advance was to inclose the graphite in wood. This permitted the use of thinner strips of graphite and made it possible to make reasonably fine lines when writing.

The idea upon which the pencil industry is based did not occur to anybody until 1795 and then, simultaneously, two inventors, one in France and the other in Austria, began to make pencils of the modern kind. Clay was found to be an ideal binder, not only because it holds the particles of graphite together, but because its plasticity makes it possible to shape the leads by extrusion through a die.

The first step in the manufacture of a lead pencil is the selection of the raw materials. There are different types of graphite and a number of grades of each type. These are not equally suitable for making pencils. In the manufacture of pencils two or more grades are usually blended.

The graphite as it comes from the mines is contaminated with gritty particles which must be carefully removed, by stirring the powdered mixture with water, allowing the heavier particles to settle, and drawing off the suspension of graphite. This treatment can not remove the finest particles of grit, because they will settle no faster than a large part of the graphite.

In another way of removing the grit, the finest and lightest bits are blown out of the mixture by means of a regulated stream of air.

It is said that chemical treatment, especially with hydrofluoric acid which dissolves the mineral impurities, is sometimes resorted to. Whatever course of purification is followed its efficiency, together with that of the subsequent grinding, is shown by the comparative rarity of gritty pencils.

The clay that is mixed with the graphite serves not only as a binder, but its plasticity makes it possible to mold the leads by forcing the moist mass through a die with a hole of the desired size. The clay should be selected as carefully as the graphite, and it must be treated with equal pains to remove grit.

In general, the hardness of a pencil lead depends upon the percentage of clay it contains, but this does not mean that all pencil manufacturers use the same formula for a given grade of hardness. Lampblack is sometimes used to make the color more intense, and it is said that the mineral stibnite—a lustrous, gray, easily fusible sulphide of antimony—is an ingredient of many leads. Both of these would have an effect upon the hardness.

Whatever the composition, the mixture is thoroughly ground with water, in a ball mill or otherwise, until the particles are exceedingly fine and the mass is perfectly homogeneous. Most of the water is removed by filtration and the remaining stiff doughy mass is extruded through dies in a hydraulic press. The dies must be made of a very hard material to prevent unduly rapid enlargement of the holes by the abrasive action of the mixture.

The extruded mass emerges in a long string, and is cut into 3-pencil lengths, straightened and laid on boards to dry. When dry the leads are cut into pencil lengths and packed in the graphite crucibles or boxes in which they are baked. Sometimes, especially in this country, the moist lead is at once cut into pencil lengths, which are dried on an endless belt while on their way to the oven, where the leads are baked at a temperature high enough to cause sintering, but not fusion, of the particles of clay.

After removal from the oven, the leads are usually ready to be encased in wood, but are sometimes first treated with a waxy mixture to make them write more smoothly.

By far the best wood is the common red cedar of the eastern United States, and the wood of a closely related Mexican tree. The wood has straight, fine and even grain, and is just brittle enough to break away easily when the pencil is sharpened. A more suitable wood could hardly be imagined, and no wholly satisfactory substitute for it has ever been found.

As cedar is becoming scarce, wood from more or less closely related trees, as well as from some species of broad-leaved or "hardwood" trees, is also used in large quantities. Among the best of these other woods is a kind of cedar from East Africa. It strains the credulity to read about the vast amount of wood that is used in this country for making pencils. The statistics include also the quantity of lower-grade wood

made into pen holders. According to the Forest Service, in 1928 the manufacturers used 39,982,000 feet, board measure, of wood of different kinds, of which 8.7 per cent was red cedar, including the Mexican species. The wood is usually sawed into "slats" which are $7\frac{1}{4}$ inches long, $2\frac{1}{2}$ inches wide, and about $\frac{1}{4}$ inch thick. Each pair of these will suffice for six pencils of the usual length, 7 inches. The manufacturer prefers slats of these dimensions, but will accept those which are wide enough for only two pencils if the wood is cedar.

On one side of each slat are cut grooves of a depth equal to the radius of the leads. The leads are laid in the grooves and a second slat is glued to this to encase the leads. When the glue is dry the pencils are cut apart, shaped, smoothed, painted, or otherwise finished, and stamped.

The leads in colored pencils, including the copying pencils commonly called indelible, are composed of coloring matter mixed with kaolin, a pure form of clay. Gum tragacanth or other similar binder is used because the leads can not be baked to make the mixture hold together. For the ordinary colored pencils almost any pigment of the desired hue can be used, but in the copying pencils there must be some water-soluble dye, so that copies can be made on damp paper in a press. Crystal violet or a similar dye is generally selected because so little of it will give an intense color to the copy. The only reason for calling these pencils indelible is that it is nearly impossible to erase the writing without smearing and staining the paper.

Pencils for writing on glass, porcelain, and similar smooth surfaces contain pigments held together by a waxy mixture. They do not write well on cold surfaces, but if the object is hot enough to soften the wax, the marks may be too heavy.

It may be wondered why there are no specifications for lead pencils. One reason is that there are no satisfactory, or at least no standard, laboratory tests, and without these a specification would be of little value.

The most important difference between pencils is their hardness, or resistance to wearing away while writing. It is not difficult to construct a machine for wearing away the lead under controlled conditions. A slowly traveling holder for the pencil and a rotating cylinder or disk covered with paper are the essentials. The details require considerable thought. A cylinder, for instance, has two serious disadvantages. It is a practical impossibility to fit the paper to it exactly, so at every revolution the pencil point is given a slight bump as it passes over the lapped ends of the paper, or falls into the space between them. Then, too, if the lead flakes off, the pieces fall away and are lost unless a special attachment for catching them is made. Loose pieces would remain on a disk and could be collected and weighed if this were thought desirable. As the disk would be covered with a circular piece of paper, there would be nothing to cause the pencil to bump at each revolution.

In order to obtain comparable results, the hardness and surface finish of the paper (qualities hard to define and measure) would have to be standardized. Its thickness, unless a cushioning effect was demonstrated, could be neglected.

The pressure of the pencil against the paper would have to be great enough to cause a reasonable amount of wear with pencils of medium hardness, so as to show a marked difference between those classed as hard and soft. As the rate of wear of the pencil depends upon its friability, or ease with which it can be crumbled, rather than upon its true hardness, or resistance to scratching or indentation, the pressure should be carefully controlled. With leads of different diameters it would be necessary to adjust the weight of the pencil holder so that the pressure upon a unit area would be the same for each lead.

The speed with which the paper is drawn under the loaded pencil may have little to do with the rate of wear on a disk, but it would seriously affect the force of the bumps on a cylinder.

Almost nobody holds a pencil perpendicular to the surface on which he is writing, but that is the best position for it in a machine for determining the rate of wear, because it makes it easiest to measure the shortening of the lead. If fixed at any other than a right angle, the end of the lead will be beveled to something like a chisel edge, which will make the flaking off of particles almost inevitable with the best of pencils. If the pencil holder is geared so that the pencil is slowly rotated, the end of the lead will be worn to a cone. In either of the two latter cases it would be necessary to make a preliminary run to get the end of the lead to its final shape. Otherwise, starting with a squared end, the thicker of two leads of the same actual hardness would have the advantage because more material would have to be worn away, and thus a longer line be drawn, before the final shape was attained.

After all of the experimental difficulties have been overcome, and the testing machine has been standardized and has come into wide use, it would be possible to write a satisfactory specification for lead pencils, based upon their rate of wear, with possibly a few other tests, such as the brittleness of the leads.

If the pencil user judged the hardness by the appearance of the writing, a determination of the blackness might be preferable to measuring the rate of wear. The general problem of standardizing a machine for testing and the method of using it would be the same as before. The blackness of the individual lines could not be measured accurately, but the grayness of the paper when revolved rapidly could be determined.

Somebody, perhaps, after considering difficulties such as those outlined in this article, has suggested that an analysis of a pencil lead would be the best means for ascertaining its hardness. Inspection of the analytical results obtained in another department on a multitude of pencils shows what should have been foreseen in advance; there is absolutely no connection between the ash or any other constituent and the grade of the pencil. Pencils of the same brand, one 4B and the other 5H, contained the same percentage of ash.

The last part of this article has not been written for the purpose of discouraging efforts to put the grading of pencils upon a sound basis. It should be possible to express hardness numerically in terms of rate of wear or in some other way susceptible of measurement, but a proper procedure can not be developed without considering a great many details. Whether it would be worth while is another question.

STANDARDIZATION BRIEFS

European air mail conference.—The nations of Europe will discuss their air mail problems and present new proposals for closer international air cooperation at a conference to be held in Brussels, Belgium, next October, 1931, according to advices received in the Commerce Department from Trade Commissioner W. L. Finger, at Paris.

Flat knit rayon underwear for women.—There will be a general conference of producers, distributors, and users of circular flat knit rayon underwear for women at 10 a. m. (daylight-saving time) Wednesday, June 24, 1931, at the Hotel New Yorker, New York, N. Y., to consider the establishment of a commercial standard covering measurements and tolerances for this commodity. All who are interested in this subject are invited to attend.

Measuring expansion of metals under intense heat.—The thermal expansion of various metal alloys has been the subject of recent laboratory tests at the National Bureau of Standards. The apparatus used in these investigations is capable of permitting such measurements at temperatures up to 1,000° C. Coefficients of expansion are determined with an accuracy of one-tenth of 1 per cent under favorable conditions.

Revision of gage tolerances.—The National Screw Thread Commission (Dr. George K. Burgess, chairman) held a meeting in Dayton, Ohio, on May 21, 1931, and took up several questions as to minor revisions of the 1928 report (B. S. Misc. Pub. No. 89). The most important items were a proposed revision of the class 4 fit, designed to render it more commercially practicable, and a corresponding revision of class X gage tolerances.

British standard for motor-car wheel rims.—A revised edition of the British standard for dimensions of wheel rims and tire bands for pressed-on tires for motor cars has been issued by the British Engineering Standards Association. The principal revision consists in the elimination of the 740-millimeter size of rim and the inclusion of 26, 28, 30, and 34 inch sizes.

Missouri to purchase by specifications.—All requests hereafter made for bids and proposals for materials, products, supplies, provisions, and other needed articles to be purchased in Missouri at public expense, are to be made in general terms and by general specifications and not by brand, trade name, or other individual mark, according to terms of a bill passed by the Missouri State Legislature on April 27, 1931.

Inter-Society Council on Color Specifications.—At a color conference held February 26, 1931, in New York, N. Y., under the auspices of the Optical Society of America and the American Physical Society, it was

unanimously voted to recommend the formation of an Inter-Society Council on Color Specifications. The council will be composed of delegates from national societies and associations interested in the standardization, descriptions, and specifications of color.

Standardization of design of limit gages.—The American Gage Design Committee (Col. J. O. Johnson, chairman) held a meeting in Dayton, Ohio, on May 20, 1931, and approved a program for continuing the standardization of design of limit gages. The work on plain and thread plugs and rings will be continued up to 12 inches, and snap gages and length snap gages will also be taken up. The committee voted to approve an alternate design for reversible type plug gages in the size range 1.510 to 4.510 inches.

Terminology for electrical engineering.—A committee appointed by the American Standards Association has been working for 18 months on the preparation of definitions of terms used in electrical engineering. The National Bureau of Standards has taken an active part in this work, being represented on many of the subcommittees and having the chairmanship of 7 of the 17 subcommittees. A preliminary set of definitions, including about 3,000 terms, will be printed during 1931.

Heat conductivity of thermal insulating materials.—The need for standardization of methods of measuring the heat insulating values of high temperature insulating materials has long been recognized. One of the current researches at the National Bureau of Standards is the development of a suitable method and apparatus for such tests. The aim is to develop an instrument of as simple a form as seems feasible, which can be set up and operated in industrial plants without excessive cost or difficulty.

Heat conductivity of metals and alloys.—A knowledge of the heat conductivities of industrial metals and alloys, particularly at high temperatures, is of increasing importance in metallurgical and engineering fields. Data available at present are very few and subject to great uncertainty. A comparatively simple yet accurate method for such measurements has recently been developed at the National Bureau of Standards, and tests on various heat-resisting steels and other alloys are in progress.

Freezing and thawing tests on sand-line brick.—Absorption determinations and freezing and thawing tests were made at the National Bureau of Standards on sand-line brick primarily to determine the value of absorption requirements in specifications as an index of weather resistance. Little relation between amount of absorption and resistance to freezing and thawing was apparent. It was found, however, that a brick having both a fast rate of absorption in partial immersion and a high strength was likely to withstand freezing and thawing satisfactorily.

Thickness of textiles measured.—As a progress report of the subcommittee on thickness measurements of Committee E-1 on Testing Methods, American Society for Testing Materials, it is recommended that the thickness of textiles and similar materials be measured by means of a gage having a presser foot 1 square inch in area which is pressed against the substance being measured by a load of 2 pounds. There are at present 26 different gages recognized in the American Society for Testing Materials specifications, differing from each other chiefly in the area of presser foot and the load.

Steel wool.—A tentative draft of a proposed commercial standard for steel wool, covering dimensional limitations for the various grades of steel wool, as well as the chemical and physical requirements for the material, was considered at a manufacturers' preliminary conference on May 14, 1931, and a revised draft will be issued as a basis for discussion at a general conference of producers, distributors, and users to be held at 10 a. m. (daylight-saving time) on Thursday, June 25, 1931, at the Governor Clinton Hotel in New York, N. Y. All who are interested in this subject are invited to attend.

Dress patterns.—As a result of a survey among the manufacturers to determine adherence to the commercial standard for dress patterns, CS13-30, a summarized report was released recently indicating that among reporting manufacturers 89.5 per cent of production conformed to the requirements of the standard. In accordance with the recommendation of the standing committee, which was appointed by the general conference to consider comment, the existing standard was reaffirmed, without change, for another year beginning December 18, 1930.

Connecticut marks miles to check odometers.—A new method of checking the accuracy of odometers is being made available on Connecticut highways, according to announcement by the highway commissioner, John A. MacDonald. The highway department, he said, is now in the process of accurately measuring and definitely marking 1 mile of State road in each of the eight counties of the State, so that automobile drivers will themselves be enabled to check their own odometers as to the reliability in measuring the distance. "Timing" tests by drivers attempting to negotiate the stretch in the shortest possible period will not be permitted, the commissioner said.

British standard for expanded metal (steel).—A new standard for expanded metal (steel), developed by the British Engineering Standards Association, contains several clauses dealing with the quality of the steel from which the expanded sheets are made, a standard method of measurement for the size of mesh and a comprehensive table of properties and dimensions of expanded sheets, providing for 74 British standard sheets. It will be possible in the future, therefore, to order these sheets to a definite British standard number. A description of a test on the finished material, after being expanded, is included in the specifications.

Lamb graded for quality.—Meat consumers in some cities can now buy dressed lamb graded for quality according to standards of the United States Department of Agriculture. This new service has been started by the Bureau of Agricultural Economics in four cities, namely, St. Louis, Detroit, Buffalo, and Erie. The guaranty of quality which the bureau's stamp on beef carries has created a demand by the trade for a similar service for lamb. It is expected that the lamb-grading service will gradually be extended to other cities.

Terms and definitions of aircraft accidents.—The terms, with definitions, used by the Aeronautics Branch in analyzing accidents were prepared by a special committee consisting of representatives of the National Advisory Committee for Aeronautics and the Departments of War, Navy, and Commerce. A complete report describing the method of analysis of aircraft accidents may be purchased from the Superintendent of Documents, Government Printing Office, at 10 cents per copy. The title of this report is *Aircraft Accidents (Method of Analysis)*, Report No. 357, National Advisory Committee for Aeronautics.

High rise bank of elevator cars.—At the spring convention of the Elevator Manufacturers Association of the United States, which met at the National Bureau of Standards on May 7 and 8, Bassett Jones, consulting engineer, told the members of some of the problems involved in the elevator layout for the Empire State Building. The high rise bank of cars has a travel of approximately 1,000 feet, and a speed of 1,200 feet per minute. A 16-foot drop test of a safety was shown the members. The record of the stop was developed and displayed to members within 20 minutes after the time the drop was made.

British standard for electrical insulating varnish.—A specification for clear baking oil insulating varnish for electrical purposes has been issued by the British Engineering Standards Association. This standard deals with varnish suitable for the general dipping or impregnation of coils used for motors, generators, transformers, and the like. It provides limiting values for drying time, electric strength, resistance to moisture, aging, and acidity, or alkalinity. Moreover, recommendations are made with regard to volatile matter, specific gravity, and viscosity. Tests to insure compliance with the provisions of the specifications are given in appendices.

Mineral oils suitable for lubrication of clocks.—Well refined and narrow cut mineral oils which do not become too viscous at low temperatures appear to be well adapted to the lubrication of clocks and other delicate mechanisms, according to studies now in progress at the National Bureau of Standards. For many years porpoise-jaw oil has been regarded as the ideal lubricant for timepieces, but it can not now be secured in sufficient quantity. It has been the common opinion that mineral oils spread on metals, while fatty oils do not; but the bureau's experiments show that porpoise-jaw oil spreads almost, if not quite, as rapidly as mineral oils of comparable viscosity. The discovery

that it does spread would seem to remove the last remaining objection to the use of mineral oils.

Elevator Safety Code for 1931.—The Elevator Safety Code, revision of 1931, gives a pit depth in terms of the over-all dimensions of the oil buffer. In an address before the Elevator Manufacturers' Association of the United States, Bassett Jones stated that at the present time no two manufacturers had the same over-all dimensions for buffers of a given stroke and that it was necessary for an architect or engineer to call on the elevator manufacturer to determine this height before laying out the elevator pit. Where the building plans are drawn before the contract is let, which is frequently the case, the architect must lay out a pit depth for the longest buffer made of that particular stroke. Mr. Jones pointed out that this was a fine field for standardization on the part of the elevator manufacturers.

Wiring standards for panel boards and distribution boards.—A pamphlet just issued by the National Electrical Manufacturers' Association presents in detail wiring standards for panel boards and distribution boards. This pamphlet shows design and construction features which experience and research have indicated to be satisfactory mechanically and electrically from the standpoint of safety and service. It was prepared by the Panel Board and Distribution Board Section of the association, the members of which have produced a large majority of all such equipment since the year 1918. A valuable new section of the pamphlet contains a list of definitions of various terms used in connection with panel boards and distribution boards. These have been made to correspond closely with the definitions of the Association of Electragists, International.

Deterioration of zinc coatings.—Among the materials in the National Bureau of Standards' investigation of soil corrosion and protective coatings are galvanized sheets and pipes with several base metals and several thicknesses of the zinc coatings. Since no satisfactory method of removing the corrosion products without removing some of the zinc also has been developed, determinations of loss of weight are not satisfactory indications of the conditions of the specimens. Therefore, the bureau has requested representatives of the cooperating manufacturers and of the national societies interested in zinc coatings to inspect the specimens and attempt to construct a rating sheet which will, by means of letters or symbols, furnish a word picture of the conditions of the specimens. The sheet will probably divide the specimens into four or five classes representing the progress of their deterioration.

New safety code to avoid dust explosions.—A new safety code for terminal grain elevators was presented before the annual meeting of the National Fire Protection Association at Toronto, Canada, on May 12, 1931, by David J. Price, chemical engineer of the United States Department of Agriculture, who is chairman of the association's committee on dust explosion hazards in industrial plants. In addition to the new regulations for grain elevators, Mr. Price's report

included recommended safety codes for wood flour-manufacturing establishments, spice-grinding plants, starch factories, and sugar and cocoa-pulverizing plants. Investigations by the Bureau of Chemistry and Soils of the United States Department of Agriculture have resulted in a number of recommendations for lessening the danger of dust explosions. These suggestions have been promptly adopted by the industries affected, and have been instrumental in reducing loss of life and property where explosions have occurred.

New 24-circuit telegraph carrier perfected in Canada.—Described as the world's greatest telegraph capacity for one pair of wires, a new service has just been put into effect between Toronto and Winnipeg, providing 24 circuits, according to advices received in the Commerce Department from Trade Commissioner Harvey A. Sweetser at Toronto. This system makes use of a double modulation principle by working two types of carrier systems, one superimposed on the other, having a theoretical maximum telegraphic speed of about 9,600 words per minute. It is expected to take care of transmission requirements between the east and the west for a number of years to come. It also demonstrates that progress in telegraphic communication has made possible a simplification of instruments used since the new 24-channel equipment takes up only half as much more space as that required for the 10-channel system installed a few years ago to handle the Toronto-Winnipeg business.

Organization of Federal Statistics Board.—On April 10, 1931, Director J. Clawson Roop, of the Federal Bureau of the Budget, announced the establishment of the Federal Statistics Board, consisting of a chairman, designated by the Chief Coordinator, and representatives of four Federal departments and seven independent establishments. The assigned duty of the board is "to study the existing situation with regard to the collection, compilation, dissemination, and utilization of statistics by agencies of the Federal Government and to make recommendations to the Chief Coordinator looking to the elimination of needless duplication in statistical work and the fullest possible utilization of statistical information collected and the personnel and facilities concerned therewith, as well as the most effective and economical means of procuring additional statistics for which there may be a reasonable demand." Capt. Howard D. Lamar, of the Supply Corps, United States Navy, has been designated as chairman of the board.

Profitable disposal of defective stamped envelopes.—Deinking tests of waste stamped envelopes have been successfully completed at the National Bureau of Standards' paper mill. The tests were made at the request of the Post Office Department to assist in profitable disposal of the defective envelopes produced in the course of manufacture of over 3,000,000,000 envelopes annually. While the number of defective envelopes is relatively small, the aggregate tonnage is worthy of consideration for reuse in making paper. The appearance and tests of papers made from the deinked waste on semicommercial scale show that a very satisfactory pulp can be prepared from the mutilated stamped-envelope waste by the ordinary deink-

ing process. Paper consisting entirely of redeemed envelope waste nearly met the Government specification for stamped-envelope paper, and paper consisting of 40 per cent stamped-envelope waste and 60 per cent sulphite pulp was above the specification.

International standard for aluminum.—About 10 years ago an international standard for aluminum to be used as electrical conductors was initiated by the International Electrotechnical Commission and has for its purpose the promotion of international trade. During the 10 years many tests have been made in the National Bureau of Standards and the national laboratories of England, Germany, and France of aluminum inductors of both American and foreign make. Various manufacturers have cooperated by furnishing samples of their product, and the American manufacturers have supplied a vast amount of data obtained in their control tests. The investigation has led to the formulation and adoption of an American standard for conductor aluminum and to a partial agreement concerning an international standard. More than half the world's supply of conductor aluminum is made on the American continent and this is of better electrical conductivity than that made abroad, hence the delay in reaching complete international agreement.

Accelerometer for engineering studies of earthquakes.—Earthquakes occasionally cause great losses of property and, incidentally, of life. Structural engineers are attempting to design buildings, bridges, etc., for active earthquake regions so as to withstand such shocks as may reasonably be expected. To make such designs, information is needed concerning actual ground movements in the vicinity of major earthquakes. The National Bureau of Standards, in co-

operation with the Coast and Geodetic Survey and others, is working on the design and construction of apparatus for recording ground accelerations within the destructive region of earthquakes. Such records, if and when attained, would enable the structural engineer to calculate the forces any particular building in the vicinity either withstood or failed to withstand. Should a considerable number of such records be obtained, they would give some information as to the forces to which buildings either already constructed or contemplated might be subjected and lead to the most economical designs consistent with reasonable safety.

Use of labels on farm products.—Agriculture is by far Maine's most important industry. To-day there are approximately 39,000 farms in Maine with a total acreage of 4,500,000, having a total value including land, buildings, and implements of \$225,000,000. In 1928 the New England Council began a campaign for the use of distinctive labels on New England agricultural products. Maine farmers have slowly been adopting this plan with the result that up to April 1, 1931, the Department of Agriculture was able to report a total sale of nearly 95,000 labels. The total number of labels sold in the New England States for that period was 5,335,992. The use of containers or packages was likewise advocated. The United States Department of Agriculture reports that over 26,000 of these packages were sold during the period. Products packaged or labeled in Maine are principally eggs, potatoes, and apples. It is reported that in many cases farmers have been able to command a premium of 5 cents per dozen over the market price for packaged eggs. The chief value of the package and the label is, of course, that it guarantees to the consumer a superior product.

VARIETY OF WAXED TISSUE PAPER SIZES SIMPLIFIED

A general conference of representatives of the industry, held under the auspices of the division of simplified practice of the National Bureau of Standards, in conjunction with a meeting of the American Waxed Paper Association, in New York, N. Y., on May 20, 1931, approved a simplified practice recommendation covering the sizes, count, and method of packing waxed tissue paper. The specific items included in the recommendation are waxed sheet tissue, lunch

rolls, lunch envelopes, butter wraps, and household rolls. A summary report of the conference will be mailed to all interests for their consideration and written approval.

A standing committee of the industry, composed of representatives of manufacturers, distributors, and consumers, was also authorized by the conference to review periodically the recommendation and to make such changes as may be necessary to keep the program abreast with current practice in the industry.

AN INVITATION TO VISIT THE NATIONAL BUREAU OF STANDARDS

A cordial invitation is extended to all interested in scientific progress to visit the laboratories of the National Bureau of Standards when in Washington. A personally conducted trip is organized at 2.15 p. m. daily except on holidays. Special trips for groups may be arranged at other times by writing to the bureau in advance. The bureau's illustrated Visitor's Manual may be had for the asking. This lists the work in progress and gives an airplane view of the ensemble and a brief statement of typical discoveries and inventions which have been notable, basic contributions to radio, aviation, and other modern arts and industries.

GEORGE K. BURGESS, *Director.*



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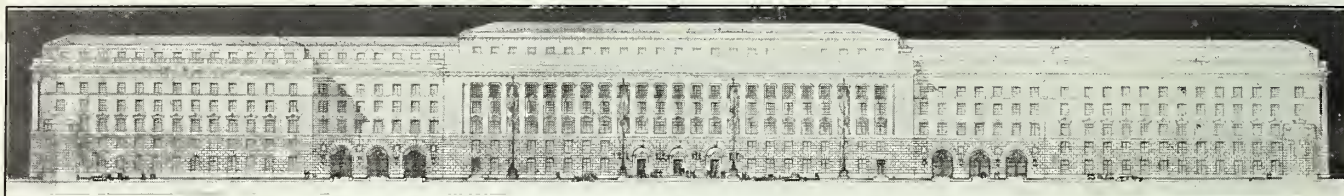
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R. P. LAMONT, Secretary of Commerce

" * * * this department * * * is devoted solely to aiding and fostering the development of higher standards of living and comfort of our people * * * its ideals are clear: That by cooperation and not by compulsion it should seek to assist in maintaining and giving the impulse of progress to commerce and industry in a nation whose successful economic life underlies advancement in every other field."

—President Hoover, at the laying of the corner stone of the new building of the U. S. Department of Commerce, June 10, 1929.



AERONAUTICS BRANCH, CLARENCE M. YOUNG, Assistant Secretary of Commerce for Aeronautics.

Establishment of civil airways and maintenance of aids to air navigation; inspection and registration of aircraft and licensing of pilots; enforcement of air traffic rules; investigation of accidents; encouragement of municipal air ports; fostering of air commerce; scientific research in aeronautics; and dissemination of information relating to commercial aeronautics. (Some of these functions are performed by special divisions of the Lighthouse Service, the Bureau of Standards, and the Coast and Geodetic Survey.)

BUREAU OF THE CENSUS, WILLIAM M. STEUART, Director.

Taking censuses of population, mines, and quarries, water transportation, and religious bodies every 10 years; censuses of agriculture and electrical public utilities every 5 years; and a census of manufactures every 2 years. Compilation of statistics of wealth, public debt and taxation, including financial statistics of local governments, every 10 years; annual compilation of financial statistics of State and municipal governments.

Compilation of statistics of marriage, divorce, births, deaths, and penal and other institutions annually, and of death rates in cities and automobile accidents weekly.

Compilation quarterly or monthly of statistics on cotton, wool, leather, and other industries; annually of forest products.

BUREAU OF FOREIGN AND DOMESTIC COMMERCE, WILLIAM L. COOPER, Director.

The collection of timely information concerning world market conditions and openings for American products in foreign countries, through commercial attachés, trade commissioners, and consular officers, and its distribution through weekly Commerce Reports, bulletins, confidential circulars, the news and trade press, the monthly Survey of Current Business, and district and cooperative offices in 65 cities. The maintenance of commodity, technical, and regional divisions to afford special service to American exporters and manufacturers.

The compilation and distribution of lists of possible buyers and agents for American products in all parts of the world and publication of weekly lists of specific sales opportunities abroad.

The publicity of statistics on imports and exports.

The study of the processes of domestic trade and commerce.

BUREAU OF STANDARDS, GEORGE K. BURGESS, Director.

Custody, development, and construction of standards of measurement, quality, performance, or practice; comparison of standards used by scientific or other institutions; determination of physical constants and properties of materials; researches and tests on materials and processes; and publication of scientific and technical bulletins reporting results of researches and fundamental technical data.

Collection and dissemination of information concerning building codes and the planning and construction of houses.

Establishment of simplified commercial practices through cooperation with business organizations in order to reduce the wastes resulting from excessive variety in commodities.

BUREAU OF MINES, SCOTT TURNER, Director.

Technical investigations in the mining, preparation, and utilization of minerals, including the study of mine hazards, and safety methods and of improved methods in the production and use of minerals.

Testing of Government fuels and management of the Government Fuel Yard at Washington.

Research on helium and operation of plants producing it.

BUREAU OF MINES—Continued.

Studies in the economics and marketing of minerals and collection of statistics on mineral resources and mine accidents.

The dissemination of results of technical and economic researches in bulletins, technical papers, mineral resources series, miners' circulars, and miscellaneous publications.

BUREAU OF FISHERIES, HENRY O'MALLEY, Commissioner.

The propagation and distribution of food fish and shellfish, in order to prevent the depletion of the fisheries; investigations to promote conservation of fishery resources; the development of commercial fisheries and agriculture; study of fishery methods, improvements in merchandising, and collection of fishery statistics; administration of Alaska fisheries and fur seals; and the protection of sponges off the coast of Florida.

BUREAU OF LIGHTHOUSES, GEORGE R. PUTNAM, Commissioner.

Maintenance of lighthouses and other aids to water navigation. Establishment and maintenance of aids to navigation along civil airways. Publication of Light Lists, Buoy Lists, and Notices to Mariners.

COAST AND GEODETIC SURVEY, R. S. PATTON, Director.

Survey of the coasts of the United States and publication of charts for the navigation of the adjacent waters, including Alaska, the Philippine Islands, Hawaii, Porto Rico, the Virgin Islands, and the Canal Zone; interior control surveys; magnetic surveys; tide and current observations; and seismological investigations. Publication of results through charts, coast pilots, tide tables, current tables, and special publications.

BUREAU OF NAVIGATION, ARTHUR J. TYRER, Commissioner.

Superintendence of commercial marine and merchant seamen. Supervision of registering, enrolling, licensing, numbering etc., of vessels under the United States flag, and the annual publication of a list of such vessels.

Enforcement of the navigation and steamboat inspection laws, including imposition of fees, fines, tonnage taxes, etc.

STEAMBOAT INSPECTION SERVICE, DICKERSON N. HOOVER, Supervising Inspector General.

The inspection of merchant vessels, including boilers, hulls, and life-saving equipment, licensing of officers of vessels, certification of able seamen and lifeboat men, and the investigation of violations of steamboat inspection laws.

UNITED STATES PATENT OFFICE, THOMAS E. ROBERTSON, Commissioner.

The granting of patents and the registration of trade-marks, prints, and labels after technical examination and judicial proceedings.

Maintenance of library with public search room, containing copies of foreign and United States patents, and trade-marks. Recording bills of sale, assignments, etc., relating to patents and trade-marks. Furnishing copies of records pertaining to patents. Publication of the weekly Official Gazette, showing the patents and trade-marks issued.

RADIO DIVISION, W. D. TERRELL, Chief.

Inspection of radio stations on ships; inspection of radio stations on shore, including broadcasting stations; licensing radio operators; assigning station call letters; enforcing the terms of the International Radiotelegraphic Convention; and examining and settling international radio accounts.

